Department of Primary Industries
Office of Water

PINNEENA GW VERSION 10.1

Groundwater bores user guide
NSW groundwater database

www.dpi.nsw.gov.au

Pinneena 10.1 Groundwater works - users guide. New South Wales groundwater database

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The NSW Office of Water manages the policy and regulatory frameworks for the state's surface and groundwater resources, to provide a secure and sustainable water supply for all users. It also supports water utilities in the provision of water and sewerage services throughout New South Wales.

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Cover: Monitoring Bore GW 036747with Solar Panels (Typical Continuously Monitored Bore)

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PINNEENA GroundWater – Version 10.1

NSW's Groundwater Archive on DVD

"Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it."

Samuel Johnson 1709 – 1784

1.0 INTRODUCTION

In producing the original surface water **PINNEENA** CD-ROM in 1990, the then Department of Water Resources provided significantly enhanced access to its surface water data archive. It was hoped that the people planning, managing and developing NSW's water resources would benefit by having all the data both widely available, and at an appropriate technology level. While technology has advanced since the first **PINNEENA**, this form of data publishing still remains the most effective method of making such large amounts of data available although now a DVD is required to handle all the data provided.

The response from within Australia, and from overseas, encouraged that Department and its successors (currently the NSW Office of Water (NOW)) to continue to publish its surface water data on the **PINNEENA CM** (Continuous Monitoring) DVD and to produce the new **PINNEENA GW** (Groundwater) disks. The first of which was produced in 2006.

This DVD contains all of the data from the NSW Office of Water's groundwater archive.

Figure 1 – Drilling a Groundwater bore in NSW

1.1 Importance of Water Data

According to the 1991 WMO/UNESCO publication "Water Resources Assessment - Progress in the Implementation of the Mar del Plata Action Plan and Strategy of the 1990s".

> *"...while the world's fresh-water resources are massive, they are not only unevenly distributed in both space and time but also have a finite limit in terms of practical utilisation. .... improving knowledge of the globe's water resources is indispensable for the well-being of mankind and for the protection of the environment. Reliable information on the state and the trends of water resources is a prerequisite for sound decisions on their sustainable management."*

Our water resources around the world are under a number of pressures that drive the need for accurate long term water data. Everywhere the hydrological cycle is being modified quantitatively and/or qualitatively. Human activities such as; land use change, urbanisation, water storage, inter-basin transfer, irrigation and drainage have major impacts on both the quality and quantity of the resource. It is probable too, that global climate change will have an impact on water resources throughout the world.

Water data is particularly important in Australia, where evidence suggests that not only is the driest inhabited continent in the world, it also exhibits runoff variability greater than on any other continent except South Africa as shown in Table 1. It has been argued that this variability is not just a product of the variable rainfall but also a product of Australia's unique vegetation and its evapo-transpiration methods.

This variability in Australian conditions has been recognised with the Australian Water Resources Council stating that

" ... with regard to water resources - the flat topography, aridity, spatial and temporal climatic variability and biological distinctiveness have produced an aquatic environment to which much overseas research is inapplicable" (AWRC 1989)[1]

Thus it is imperative that Australian authorities both collect and use data from within Australia when making natural resource related decisions. **PINNEENA GW** provides just such a resource.

Table 1 - World-Wide Flow Variability.

Area	Annual Flow Variation	Peak Flow Variation
World	0.43	0.28
Northern Africa	0.31	0.18
Asia	0.38	0.24
North America	0.35	0.25
South America	0.35	0.14
Europe	0.29	0.17
Southern Pacific	0.25	0.22
Southern Africa	0.78	0.46
Australia	0.70	0.45

Source: Finlayson and McMahon 1991[2]

[1] AWRC, "Guidelines for the Design and Operation of Surface Water Information Systems", AWRC Water Management Series, No 18, 1989.

1.2 Groundwater

Groundwater is often referred to as the forgotten resource - “out of sight, out of mind”. It is a resource that is poorly understood by most people, although many have heard of the Great Artesian Basin, and most of us consume some of the many spring and bottled waters available.

Groundwater, in a broad sense, is all water which occurs below the land surface in aquifers. Aquifers occur in geological formations which are sufficiently permeable to allow water to move within them, and allow it to discharge or be extracted. Groundwater is usually categorised as occurring in:

- **Unconsolidated sediments** - non cemented sands and gravels commonly found in alluvial valleys, coastal plains and sand dune systems. Groundwater is contained within the pore space in these sediments.
- **Sedimentary rocks** - consolidated or semi-consolidated formations such as sandstone, limestone, shales. Groundwater occurs both within the pore space in the rock matrix and also within fractures and joints.
- **Fractured rocks** - volcanic and metamorphic rocks such as granite, basalt, shales and gneiss. Groundwater in these rocks occurs mainly within fractures and joints.
- **Coastal Sands** -. typically composed of unconsolidated sediments such as estuarine deposits and beach dunes. They are mostly unconfined with a high porosity and shallow depth to the water table

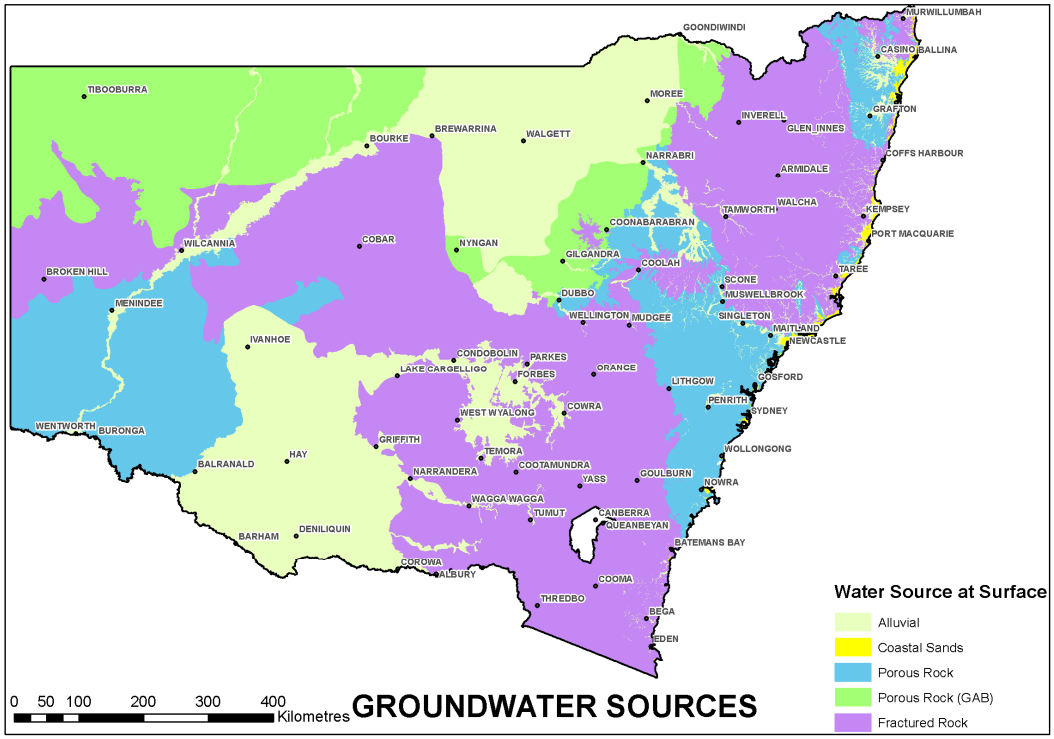

Figure 2 – Groundwater sources in NSW

[2] Finlayson BL and McMahon TA, "Runoff Variability in Australia: Causes and Environmental Consequences", International Hydrology and Water Resources Symposium, Perth, October 1991, p 504-511.

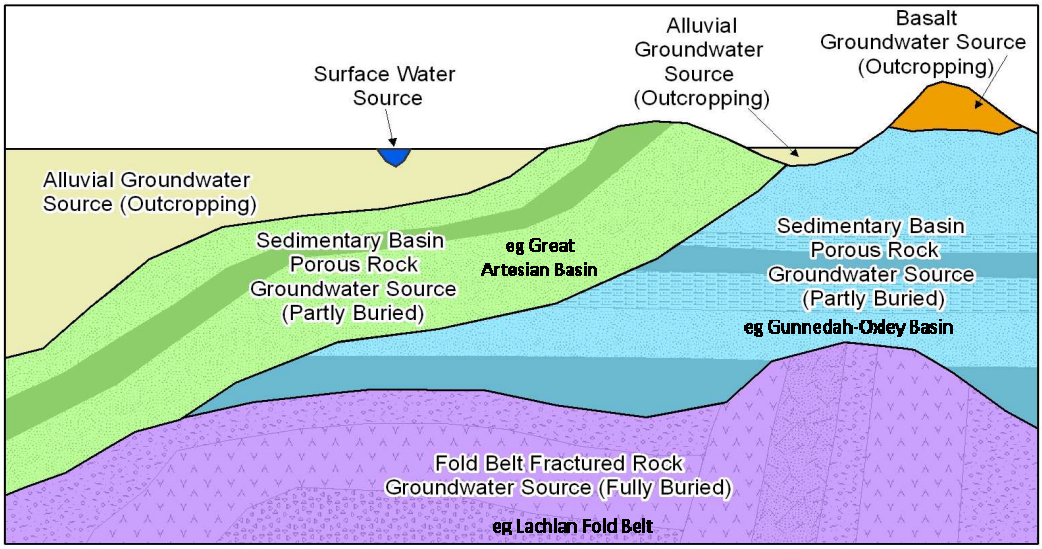
Surface Water Source
Alluvial Groundwater Source (Outcropping)
Basalt Groundwater Source (Outcropping)
Alluvial Groundwater Source (Outcropping)
Sedimentary Basin Porous Rock Groundwater Source (Partly Buried)
eg Great Artesian Basin
Sedimentary Basin Porous Rock Groundwater Source (Partly Buried)
eg Gunnedah-Oxley Basin
Fold Belt Fractured Rock Groundwater Source (Fully Buried)
eg Lachlan Fold Belt

Figure 3 – The 3D nature of groundwater sources in NSW

Natural groundwater quality generally reflects both the mineral content of the host rock through which the water is travelling, and the length of time that the water is in contact with the rock. The rate at which water travels through a groundwater system may vary from tens of metres a day for highly permeable beach sand, to as little as a metre a year in dense clay.

Because groundwater is out of sight, its occurrence and movement are generally poorly understood. Groundwater constitutes part of a dynamic water cycle, and is interrelated with surface water. Surface water infiltrates geologic formations to become groundwater.

Groundwater reappears at the surface through springs and seeps, and emerges in rivers, lakes, wetlands and the ocean.

1.3 Groundwater in NSW

Groundwater is an important resource in NSW. It makes a substantial contribution as a source of water for the maintenance of aquatic environments, and is an integral component in the long-term management of water resources on both regional and State levels.

Groundwater is an important commodity, and a vital component of both urban and rural industries, and our economic and social framework. Groundwater provides a water supply to over 130 communities in NSW. For some of these communities, it is their only source of water. The water is used for drinking, industry and commerce, stock watering, and irrigation. The cost of finding alternative supplies in these cases may be prohibitive.

The volume of all groundwater in NSW is estimated to be about 5,110 million mega litres (ML), enough to cover the State to a depth of four metres. This is about 200 times the storage capacity of all the water supply dams in the State. Unfortunately the groundwater is not all of good quality nor uniformly distributed, with less than 5 million ML suitable or obtainable for use. Records reveal extreme variations - at depths from a few metres to some 1,400 metres, yields from nil to 400 litres per second, and salinity from about that of rainwater to about ten times that of seawater.

Table 2 – Groundwater Sources in NSW

Groundwater Source	Number of groundwater sources	Volume of entitlement (GL)
Alluvium	119	1,438
Coastal Sands	18	77
Porous rock	24	286
Fractured rock	25	188
total	186	1,989

Total consumption in NSW is about one million mega litres a year on average, with more than 600,000ML used each year for agriculture and stock purposes, as well as 15,000ML for industry, commerce, mining and recreation. An additional 60,000ML is taken for urban use by over 130 communities, as well as an unknown amount for private, domestic purposes, especially in arid areas of the state where surface supplies are unreliable or absent. There are more than 100,000 licensed extraction bores in NSW.

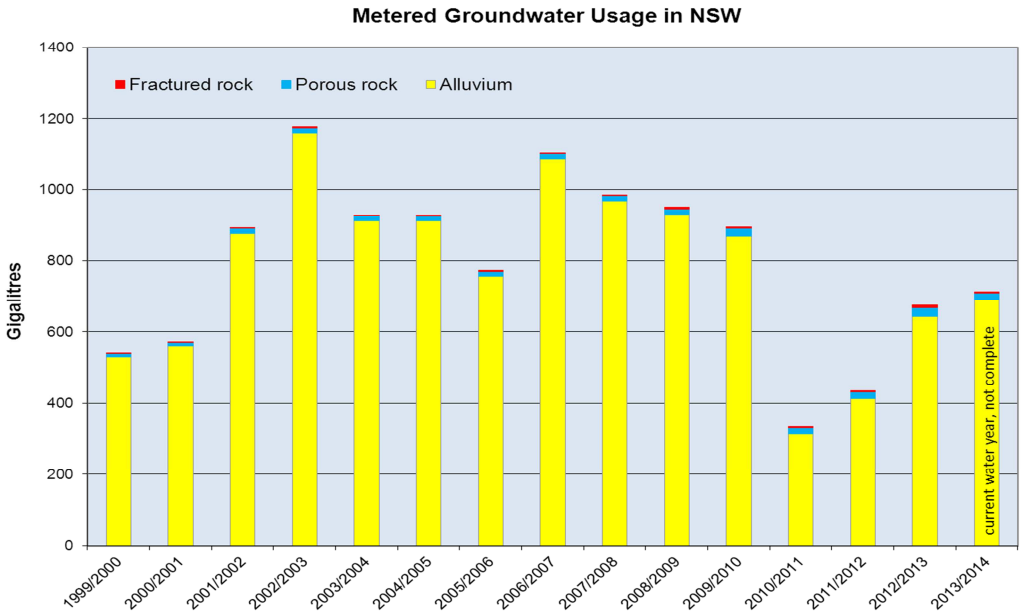

Figure 4 Metered Groundwater Usage in NSW

Note: 70% of groundwater entitlement is monitored

The State's aquifers vary dramatically in their ability to yield groundwater. The states alluvial aquifers in the west of the state provide the vast majority of the groundwater used as is shown in Figure 4 and Table 2. In some areas, groundwater extraction has already begun to put the resource under stress. This has resulted in unacceptable drawing down of some aquifers, jeopardising the long term sustainability of supply, and increasing pumping costs. Still groundwater can be obtained from a wide variety of aquifer systems and its uses are extremely diverse. It is a vital resource that has led, and now supports, agricultural and grazing development over much of inland NSW.

Unlike surface water, groundwater can be found in most areas of NSW. However, it varies considerably in terms of its recharge potential, vulnerability to pollution, and its connection

to surface waters and other ecosystems. It is, however, a vital town water supply source, drought reserve, or alternative to fully committed or contaminated surface supplies. It is:

- widely distributed and accessible;
- reasonably constant in quality within an aquifer;
- a mappable, predictable resource; and
- often large in volume and an effective buffer to drought

The need to properly manage groundwater is, therefore, directly related to the value of this resource and the risk of devaluation or destruction of the resource or related environments through over-exploitation or contamination. The risks of groundwater resource degradation are real and significant, and in some areas of the State the effects of degradation are beginning to translate into economic and environmental losses.

In recent years, concern has increased about the declining condition of the State's water resources. Increasing pressures on groundwater use have already resulted in the overexploitation of some aquifers, and this may affect long-term supplies. Contaminated groundwater has been identified in both rural and urban areas, and in a number of cases has posed serious threat to human and animal health. In addition, rising water tables and salinity problems have decreased the utility of other land and water resources, and important wetlands have been degraded or lost altogether.

A variety of natural ecological systems are also sustained by groundwater, including the base flow of rivers, swamps, wetlands, springs, and some lakes.

It is now understood that groundwater and surface water systems are closely integrated in the water cycle. Surface waters can flow naturally to groundwater, and conversely, groundwater can be critical in providing base flows to surface water systems. The same relationships can hold for other aquatic ecosystems such as wetlands, springs, lakes and hanging valleys. The need to manage these systems as 'one resource' is becoming increasingly more apparent.

1.4 Groundwater Quality

1.4.1 General

While groundwater occurs everywhere below the ground surface. It varies greatly however in quality, quantity and depth depending on host rock type, the nature of the overlying soils and the rainfall of the region.

By its nature, groundwater is often less susceptible than surface water to short term depletion and contamination. However, if excessively depleted or polluted, there is often little that can be done to restore a groundwater system to its natural state.

In NSW, the quality of groundwater varies dramatically from region to region. One measure of quality is the level of natural salt content present in groundwater. As stated before salinity levels can range from that of rainwater to more than 10 times that of sea water.

The lowest salinity groundwater can generally be found in the large unconsolidated alluvial systems associated with the major westward draining rivers. Many coastal sand dune systems also contain low salinity water, as do the consolidated sediments of the Great Artesian Basin which occur at depth in the north west of the State. Figure 3 shows groundwater availability and salinity across NSW.

Groundwater quality is known to be deteriorating in many parts of the State through contamination from human activities such as urban and rural development, use of fertilisers and pesticides, leaking sewage pipes, septic tanks, tip sites, mining and seepage from contaminated lands.

Figure 5 Groundwater Quality Sampling at a Bore

Also, surface water systems into which groundwater flows, such as wetlands, may have environmental values and require the incoming waters to be of a very high quality. The protection of groundwater resources in such areas is an important aspect of total water management.

Table 3 Types of Groundwater Quality Monitoring Undertaken in NSW

Area	No. bores	Type of analysis	Purpose
Alluvium	170	Major cations and anions	WSP
	390	Field EC	Salinity management
	75	Field EC	WSP
	2	Major cations and anions	Background sampling in CSG areas
Porous Rock	17	Major cations and anions	Background sampling in CSG areas
	75	Field EC	WSP
Fractured Rock	25	Field EC	WSP
Coastal sands	75	Major cations and anions	WSP
	6	Major cations and anions	Salt water intrusion

When groundwater is extracted and used for irrigation, proper consideration must be given not only to the quality of the waters but also to the compatibility of the water with respect to the soil and crops on which it is to be applied. If not, it could cause a breakdown in soil structure, salinisation of the root zone, leaching of salts to underlying groundwater and, ultimately, the movement of salts into creeks and rivers. Groundwater that has a high sodium adsorption ratio, for instance, should not be used on sodic soils. Saline drainage flows need to be managed to prevent contamination of surface waters.

Similar problems occur in the bore drains used to distribute water from flowing bores in the Great Artesian Basin. Here the continual use of low gradient drains that pass through sodic soils with limited leaching capacity has caused a build up of soil salinity in the immediate vicinity of the drains. This has often caused native vegetation to die off and be replaced with non-native salt-tolerant species.

There is only a recent awareness of the significant role played by groundwater as a component of the physical environment. This awareness has resulted from the observation of the impacts of rising and falling water levels. A consequence of rising water levels is the emergence of poor quality water into streams, wetlands and soils, while falling water levels have resulted in the drying of some wetlands and many of the mound springs of the Great Artesian Basin, as well as a reduction in base flows to many streams. Many surface water ecosystems are largely dependent on groundwater, and their protection is directly related to its protection.

In many situations, the naturally poor quality of groundwater may diminish the perceived need for protection, unless the significance of groundwater as a support to more sensitive water environments is taken into account. Contamination of brackish aquifers, particularly where they are highly permeable, can lead to serious degradation of surface water environments receiving such groundwater discharges. Consequently, the environmental value of groundwater can in some cases be the critical factor which determines protection measures.

1.4.2 Threats to Groundwater Quality

Unlike rivers, which flow in defined channels, groundwater is present everywhere beneath our feet. Many of our activities, therefore, pose potential threats to the quality of our groundwater resources. Many low lying sites were progressively filled in with industrial and urban waste in the first half of this century in the industrial centres of Sydney, Newcastle and Wollongong, causing contamination of the groundwater. Contaminated groundwater systems can pose a threat to other connected ecosystems. Wetlands, for example, are often degraded by groundwater that has become polluted through the burial of waste in the immediate catchment.

Generally, contamination can be described as coming from either ‘point’ sources or ‘diffuse’ sources. Point source contamination may range from land fill sites (for example domestic tip sites and industrial land fill sites), to animal-based waste from abattoirs, cattle feed lots and piggeries. Diffuse source contamination includes the spreading of fertilisers onto agricultural land, urban runoff and the fallout from industrial smoke stacks.

Along with threats from surface activities, there is a very real danger that pumping large volumes of groundwater will result in deterioration in water quality where poor quality water is drawn into an aquifer containing high quality water.

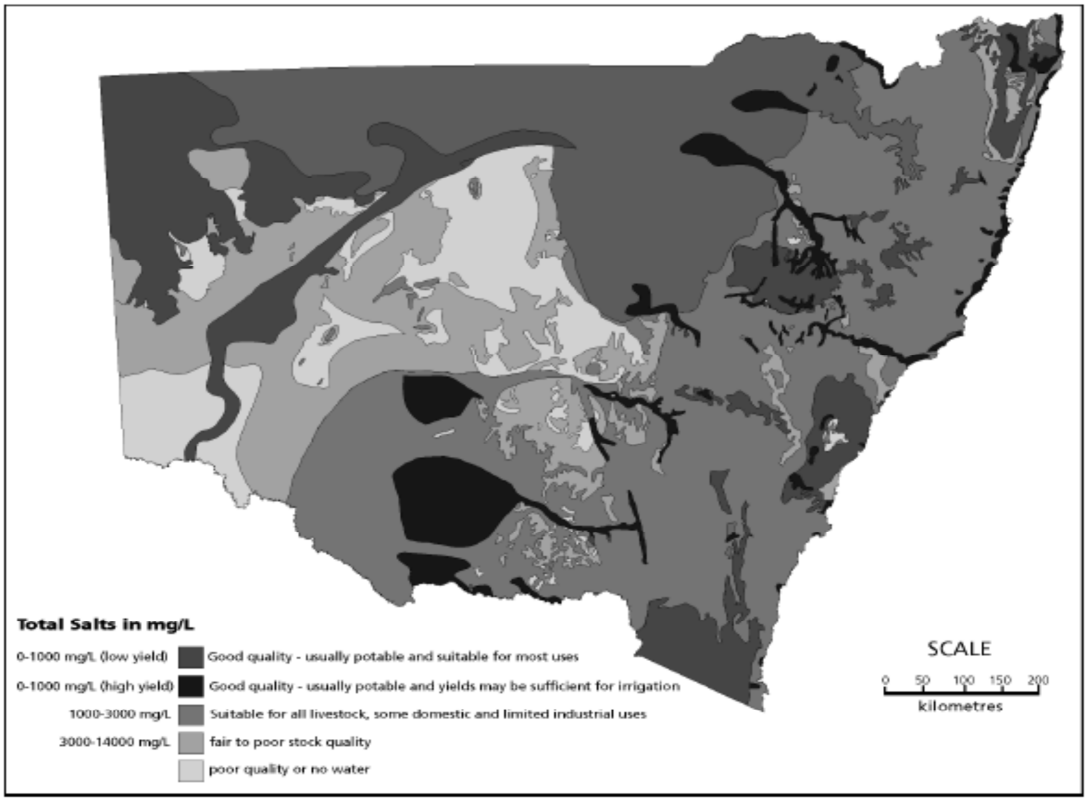
Total Salts in mg/L
0-1000 mg/L (low yield)
Good quality - usually potable and suitable for most uses
0-1000 mg/L (high yield)
Good quality - usually potable and yields may be sufficient for irrigation
1000-3000 mg/L
Suitable for all livestock, some domestic and limited industrial uses
3000-14000 mg/L
fair to poor stock quality
poor quality or no water
SCALE
0 50 100 150 200
kilometres

Figure 6 – Groundwater Salinity Map

If groundwater becomes polluted, it is difficult or impossible to clean up completely. The slow rates of groundwater flow and low microbial activity limit any self-purification.

Processes which take place in days or weeks in surface water systems may take decades to occur in groundwater. In addition, the costs of remediating groundwater systems are very high. It is, therefore, better to prevent or reduce the risk of groundwater contamination than to deal with its consequences.

1.5 Data on Pinneena GW

NOW monitors groundwater levels from 6,000 bores at 4,000 sites as shown in Figure 7. Real-time water level data is recorded from over 380 sites which the public can access through an online web portal or via a mobile application. This monitoring network is focused primarily on the areas of greatest groundwater extraction and typically the The total combined depth of the monitoring bores is approximately 415km with an estimated replacement cost of $250 million

The Pinneena GW DVD also contains data about the over 125,000 groundwater extraction bores drilled throughout the state

The following details about/from the bores are available in Pinneena:

- Bore Location – Details of where the work/ bore is located
- Construction Methods
- Development Methods
- Drillers Logs
- RLMP
- Water level depths
- Purpose/ Intended Use etc

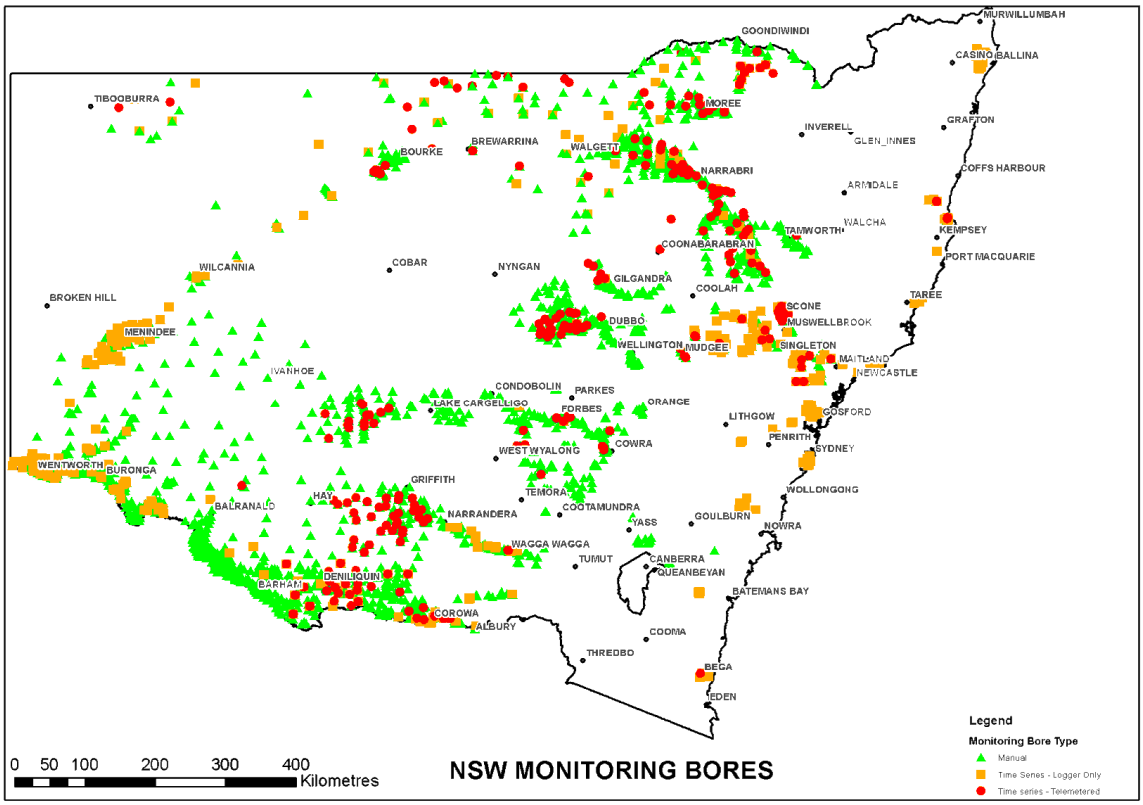

Figure 7 Monitoring Bore Locations

1.6 Pinneena Updates

The PINNEENA DVD version numbers reflects both the version of HYDSTRA software on the DVD and the data updates. So PINNEENA DVD **N.3** indicates that Version N of HYDSTRA is being used and that it is the 3rd data update in this series. If the next PINNEENA DVD still used Version N of HYDSTRA, the next PINNEENA DVD version number would be **N.4**.

Future updates of PINNEENA DVD will take place at irregular intervals (typically every 2 years) depending on:

- Product demand
- Data quality changes
- Software enhancements

1.7 License Agreement

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2.1 Data Analysis

This data reflects the natural conditions under which it has been collected. There are a number of factors that should be considered when any extrapolation or prediction based on this data is carried out.

2.1.1 Hydrologic Trends

The use of hydrologic information including groundwater levels that is representative of long term conditions to support natural resource management decisions is very important in Australia because of the extremely variable climatic conditions that occur. Marked shifts in climate regime, known as secular changes, also occur from time to time. These climate characteristics are most pronounced in south-eastern Australia, and particularly in NSW.

In NSW, rainfall, stream flow and other hydrologic data show that from about 1948 to the late 1990s the climate was significantly wetter on average than in the period from about 1890 to 1948. In terms of rainfall the increase is about 15% while in terms of streamflow increases of as much as 60% were noted. In addition, droughts tended to be much shorter during the period 1948 to 1990 than they were between 1890 and 1948.

While data was sparser in the 19th century, it is evident that in about 1890 an opposite shift to that of 1948 occurred, and that other shifts up and down of varying magnitudes and durations occurred before 1890 (based on data from Lake George). Again from the late 1990s to 2010 the climate was significantly drier. Whether this trend will continue and/or for how long is yet to be determined. It is therefore apparent that secular changes in climate, either up or down, can occur at any time.

2.1.2 Climate Zones in NSW

NSW covers a number of seasonal zones. In the inland there are three main rainfall zones. In the south of state the rainfall pattern is winter dominated (the Murray and Murrumbidgee basins), while in the north of the state the rainfall pattern is summer dominated (the Border Rivers, Gwydir and Namoi basins). The Macquarie and Lachlan basins are in a transition zone between winter dominated rainfalls in the south to summer dominated in the north. As always there are exceptions to the rules. For example with the Monaro area around Cooma (in the Murrumbidgee basin), any rainfall it gets is mainly in spring (Figure 8).

On the coast and eastern side of the ranges local orographic effects complicate the situation. Dorrigo, Laurieton, Comboyne, the Barrington Tops, the Illawarra and around Gosford are examples of areas where local orographic effects are strong. On the North Coast, north from about Grafton, there is a winter peak in rainfalls due to onshore south-easterlies as well the usual summer rainfall peaks. The Hunter and the Warragamba catchments exhibit a mixture of coastal and inland characteristics (stronger in the Hunter).

The climatic conditions in these zones and the various physical factors impact on the timing and amount of rainfall that are available to provide natural recharges to aquifers. As indicated earlier this could also be being impacted by secular changes in the weather.

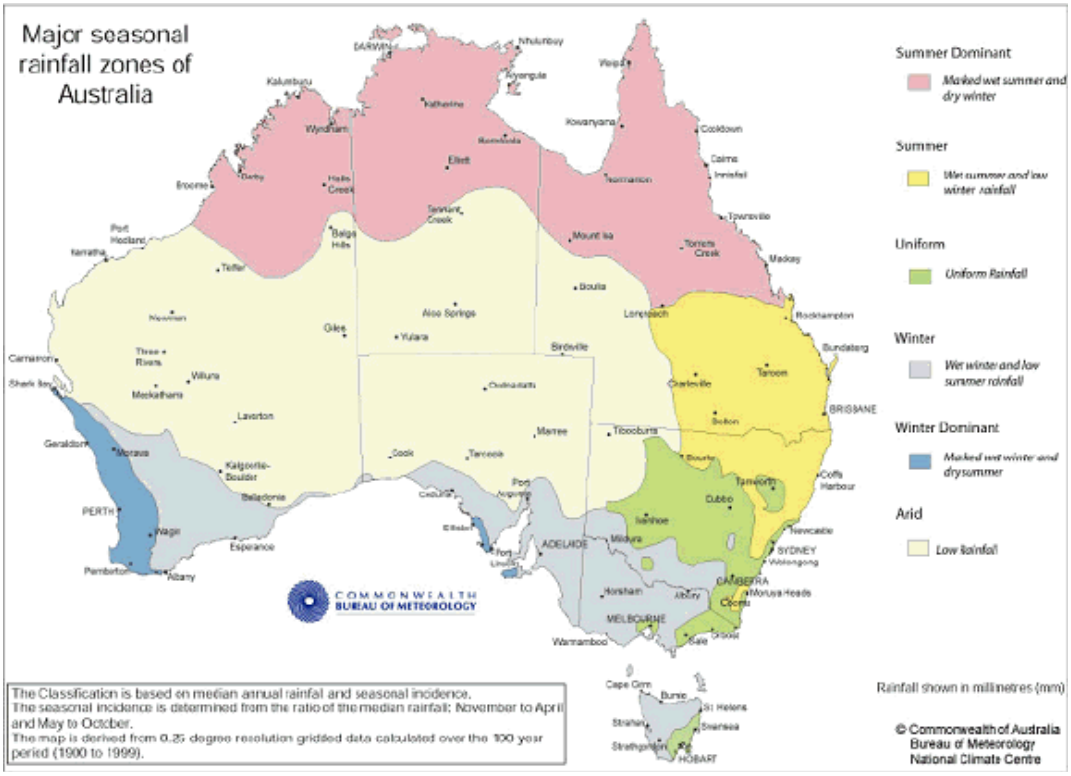

Major seasonal rainfall zones of Australia
Summer Dominant
Marked wet summer and dry winter
Summer
Wet summer and low winter rainfall
Uniform
Uniform Rainfall
Winter
Wet winter and low summer rainfall
Winter Dominant
Marked wet winter and dry summer
Arid
Low Rainfall
COMMONWEALTH BUREAU OF METEOROLOGY
The Classification is based on median annual rainfall and seasonal incidence.
The seasonal incidence is determined from the ratio of the median rainfall: November to April and May to October.
The map is derived from 0.25 degree resolution gridded data calculated over the 100 year period (1900 to 1999).
Rainfall shown in millimetres (mm)
© Commonwealth of Australia Bureau of Meteorology National Climate Centre

Figure 8 Rainfall Zones in Australia

2.1.3 Groundwater Usage

Another factor particularly impacting groundwater data is the level of groundwater usage. This varies both with climatic conditions, with location specific developments and to some extent with time.

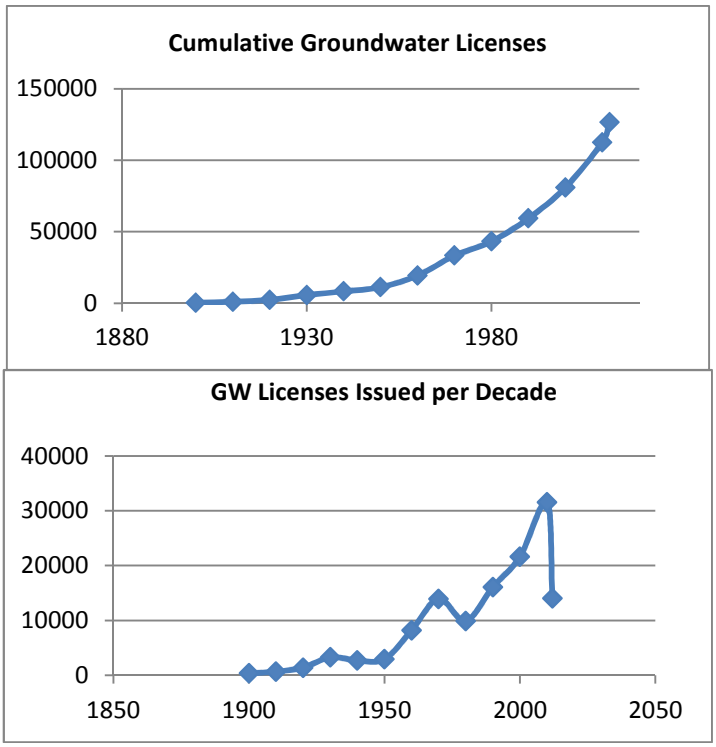


Figure 9 Growth of Groundwater Licenses in NSW

Note: last value is for 3 years only from 210-212 inclusive

Groundwater usage while capped in many areas has increased dramatically since the 1980s No readily available figures are available to quantify this however Figure 5 shows the growth of groundwater licences in NSW and is a useful indicator of likely usage increases. The drought of 1990-2010 spurred the search for alternative water sources and also depleted groundwater stocks in many areas. These impacts on groundwater levels will be reflected in the recorded data.

2.2 Data Quality

The data on this DVD is as recorded both by instruments in the field, manual dipping and transcription of Drillers logs. Gross editing and error correction has been undertaken where possible. However no hydrogeological examination of the data is conducted before it is included on the archive or the **PINNEENA GW** DVD. Therefore the *NSW Office of Water* can make no guarantee that data at individual bores is necessarily fully correct.

2.3 Data Quality Assurance

PINNEENA GW contains vast quantities of groundwater information, some of which is over a hundred years old. While the Department continues to refine and correct data, because of the historic nature of the archive there will be errors and omissions in the data. To assist us to improve our data quality we would ask you to report any errors or omissions that you may find.

The Department is working to quality certify its hydrogeological data collection activities and it is looking to undertake continuous quality assurance reviews of its groundwater monitoring data. Your feedback on any data or software errors in **PINNEENA GW** will assist with this and contribute to improved data quality in future releases.

We are also interested in hearing of your impressions, experiences and opinions on all aspects of **PINNEENA GW**, including the data, the software and the documentation,. Included with this manual is an evaluation form which we would like you to complete and return once you have explored **PINNEENA GW** and have some experience with its use,.

3.0 SETTING UP PINNEENA GW 10.1. DVD

3.1 What you need to use the PINNEENA DVD

PINNEENA is produced to ISO 9660 standards and requires an IBM compatible computer with a hard disk and DVD reader. PINNEENA will run on Windows 2000, XP, Vista , Windows 7, Windows 8 and on both 32 and 64 bit versions of these operating systems where available. It will not run on Linux or older versions of Windows.

This users' guide assumes you are familiar with basic commands and procedures for the Windows operating system. Knowledge of surface water data and HYDSTRA are also considered desirable to utilise PINNEENA to its fullest potential, but they are not essential.

Help is provided for using the data and tools on the PINNEENA DVD both directly from the programs themselves, and in this guide. Further advice if necessary can be obtained by contacting one of the numbers listed in the Product Support section 1.5

3.2 Computer Requirements

The minimum configuration for running Pinneena are as follows (i.e. it still currently runs on a system with the following configuration, albeit very slowly):Intel Pentium II 500

- 640 Mb RAM
- 50 Mb free disk space
- SVGA Monitor (800*600)
- Microsoft compatible mouse
- DVD Reader
- Windows 2000

However the recommended minimum configuration for reasonable performance would be along the lines of the following:

- Intel Pentium 4
- 1 Gb RAM
- 200 Mb free disk space
- XVGA Monitor (1024*768)
- Microsoft compatible mouse
- DVD Reader
- Windows XP

Obviously the faster the CPU and the higher the amount of RAM the better the performance will be. All modern machines will run Pinneena. DVD speed is generally not an issue for most modern systems.

A minimum of 50 megabytes of free hard disk storage is required on the PC for temporary files but more is better for PINNEENA and system performance. Pinneena has been tested in the following versions of Windows (as per table below).

This version of PINNEENA will not run under any version of Linux, Unix, DOS, Windows 3.X, Windows 95/98 or Windows NT 4.

PINNEENA outputs text and high resolution graphics and a XVGA screen at 1024 by 768 pixels is the recommended minimum.

Table 4 Operating Systems where Pinneena can be Used

Windows OS Version	32bit	64bit
2000	√	
XP	√	
Vista	√	√
7	√	√
8 - 8.1	√	√
10		√

PINNEENA will also produce graphical and textual outputs on any Windows supported output device. It is also possible to use the Windows clipboard's cut and paste features to capture this output and paste into other applications eg MS Word.

Note: The outputs from PINNEENA can contain large amounts of data. If plots are produced with missing or incomplete traces it is likely that the printer requires more memory. This is generally not an issue with modern PCs and printers.

3.3 Pre-Installation checks

The PINNEENA DVD will run successfully on PC's running Windows 8 and 8.1, Windows 7, Vista, XP, or Windows 2000. However, please note that we have discovered that some systems may have trouble reading DVD +R discs while others may have problems reading DVD -R discs.

This issue is generally evidenced by not being able to fully install the PINNEENA software due to read errors from the disk.

PINNEENA DVD is produced in both versions. If you have any troubles reading the DVD please inform us and send the DVD back to the Parramatta office where a replacement will be dispatched back to you.

If the disk has been damaged and is unusable then you will be charged a replacement fee.

3.4 PINNEENA DVD Set-up

There are some basic things you may need to do before you can successfully run the DVD on some older systems. The installation program checks that these things have been done and flags any areas of concern. However, it is up to you to make any necessary changes.

Insert the PINNEENA disc in the DVD reader.

Start Windows Explorer and find the **SETUP.EXE** file on the home/root directory level of the DVD.

Run the **SETUP.EXE** program. This will create the entries in the Start Menu needed to run PINNEENA.

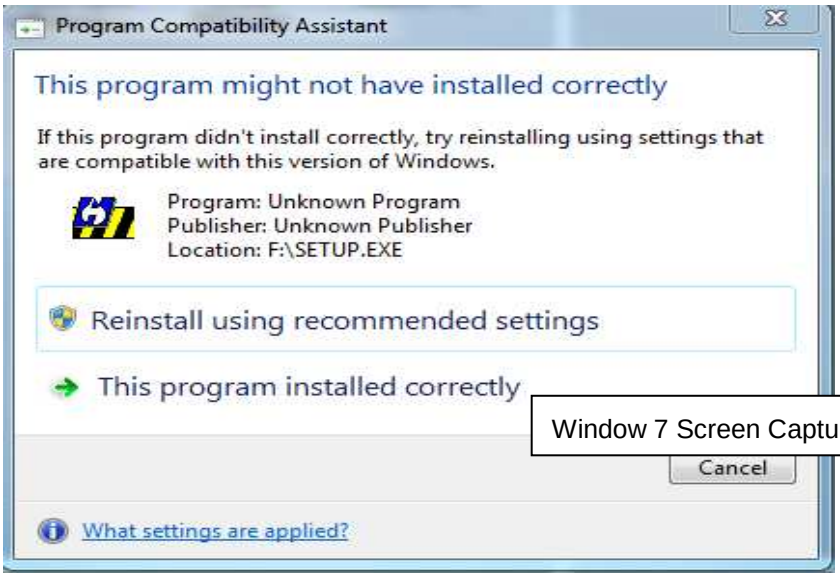
The PINNEENA DVD must be in the DVD reader for the system to work.

3.4.1 Installation in Windows 7 and Windows 8

There can be some issues with installing the PINNEENA software under Windows 7 and/or Windows 8 due to the UAC (User Access Control) features of these operating systems. It is generally less of an issue in Windows 8 as Microsoft recognised the problems from Vista and have relaxed many of the restrictions and automated the responses.

However there are still some common problems that can occur with either version:

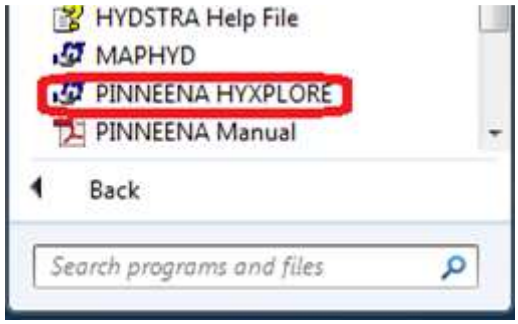
1. You may be blocked from installing the program
2. A program may fail to operate due to lack of write permissions in the \Temp directory (HYDSTRA writes temporary files to the \Temp and \Temp\Temp directories and requires write permissions at this level)
3. Issues with accessing the HELP file contents
4. When the program has finished installing you may receive the following error shown below. Select Reinstall using recommended settings.


Program Compatibility Assistant
This program might not have installed correctly
If this program didn't install correctly, try reinstalling using settings that are compatible with this version of Windows.
Program: Unknown Program
Publisher: Unknown Publisher
Location: F:\SETUP.EXE
Reinstall using recommended settings
This program installed correctly
Cancel
What settings are applied?
Window 7 Screen Capture

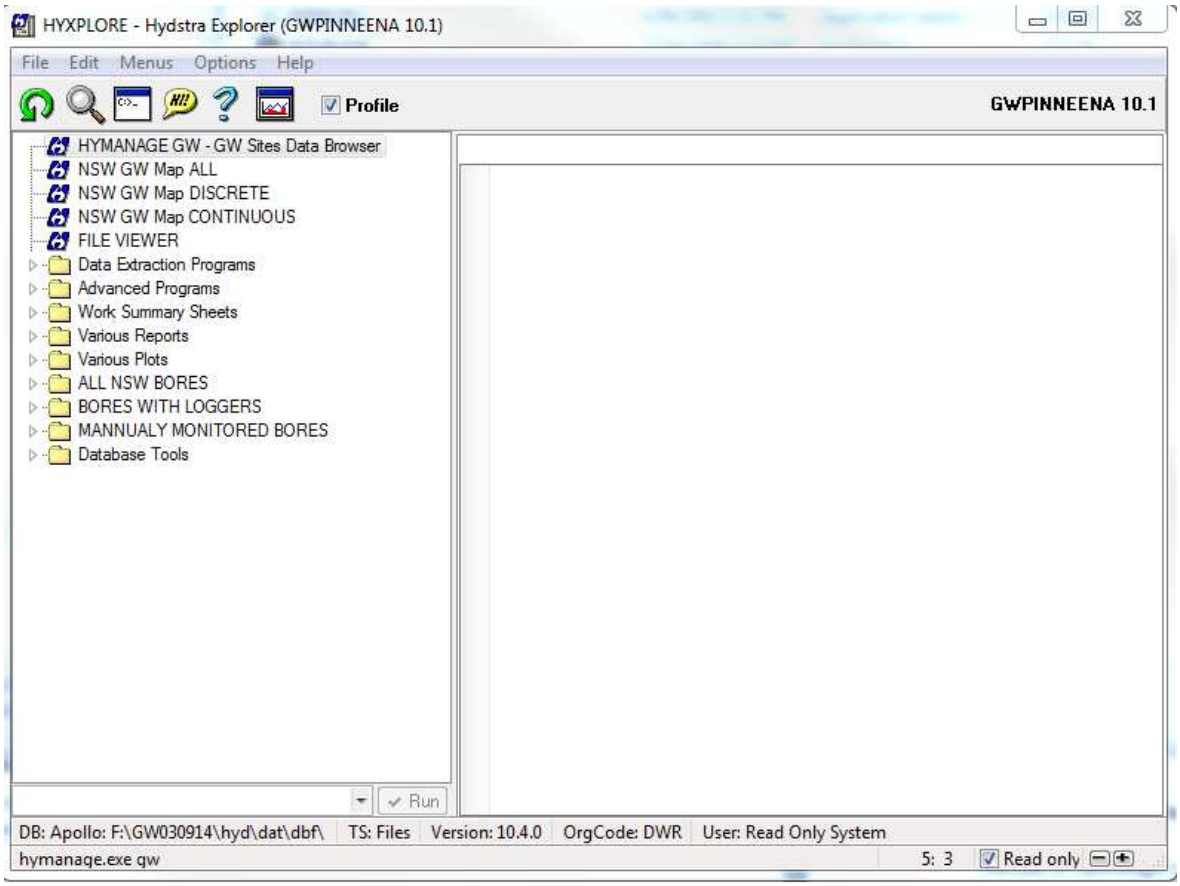
To make the process more straight forward, we recommend that you are logged on as an administrator to install new programs. However for reasons best known to Microsoft, even though you may be logged into an administrator account, the install jobs don't normally run with admin privileges.

We suggest that you try to install PINNEENA first. If this is successful, then run a test program such as HYCSV, as shown below.

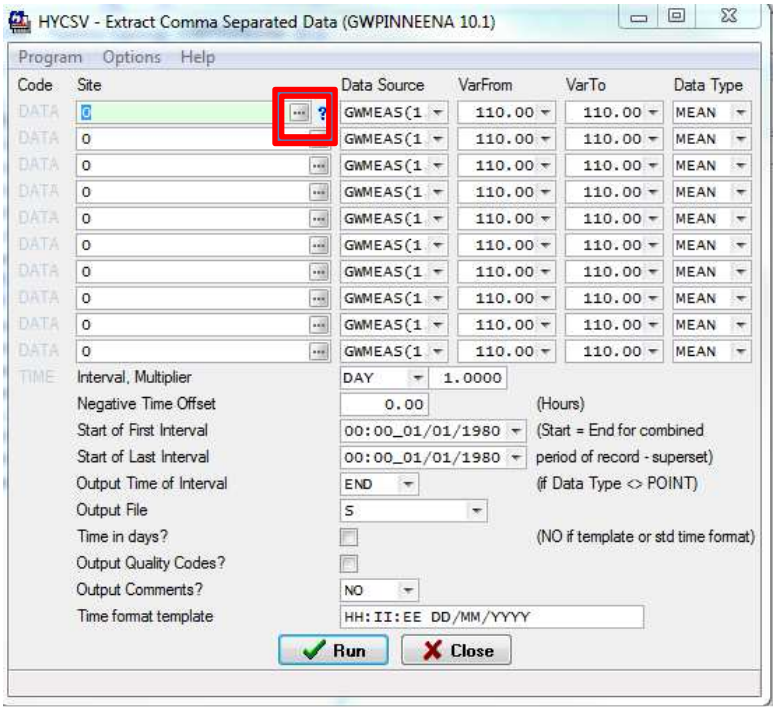
Go to the Start Menu > All Programs > Pinneena 10.1 > Select Pinneena Hyxplore,



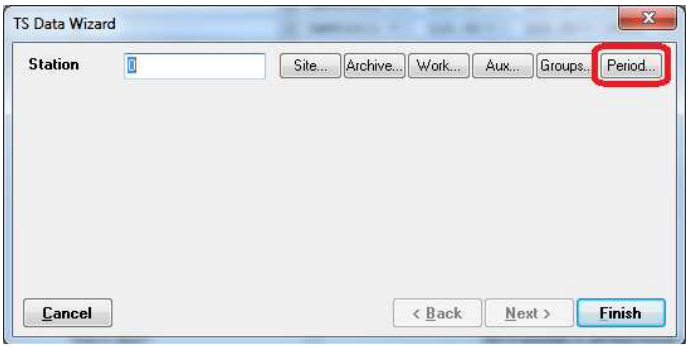
Within Hyxplore > Type HYCSV > Click on the Run button.



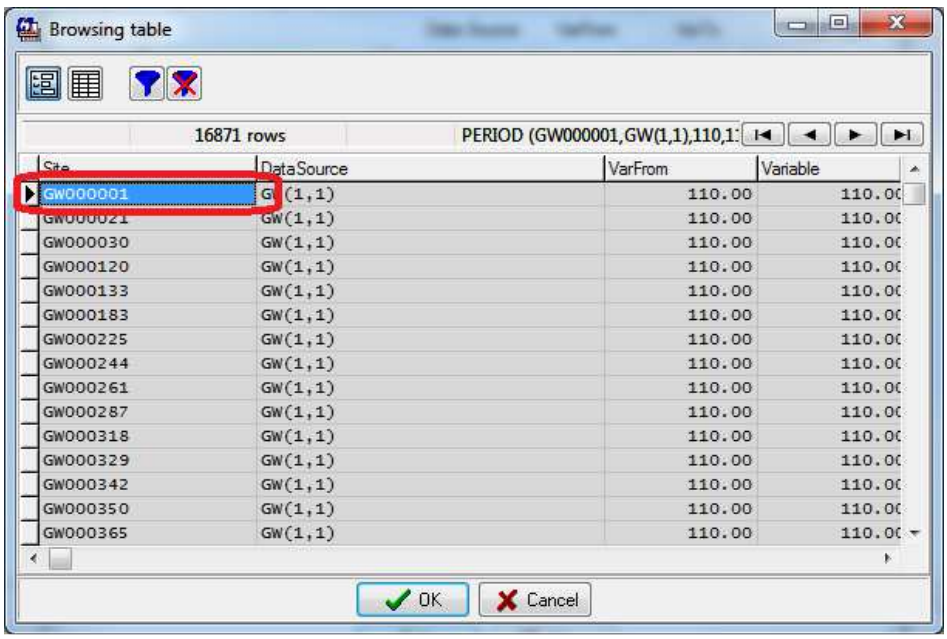
To select a Site click on the button where the ? is (marked red in the picture below).



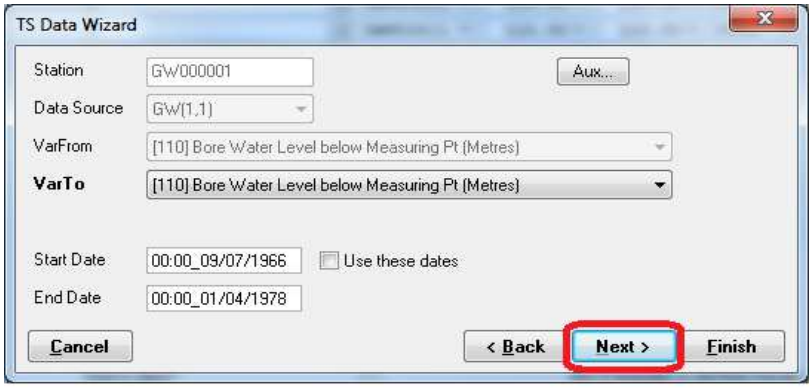
Click on the Period button.



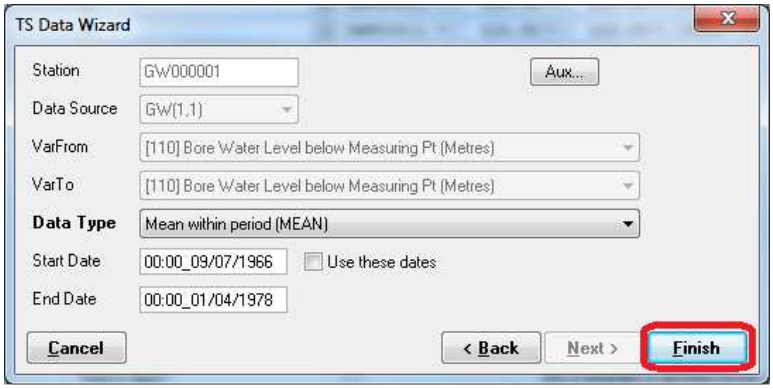
The Browsing table well then appear. Click on GW000001 site > Then click on OK.



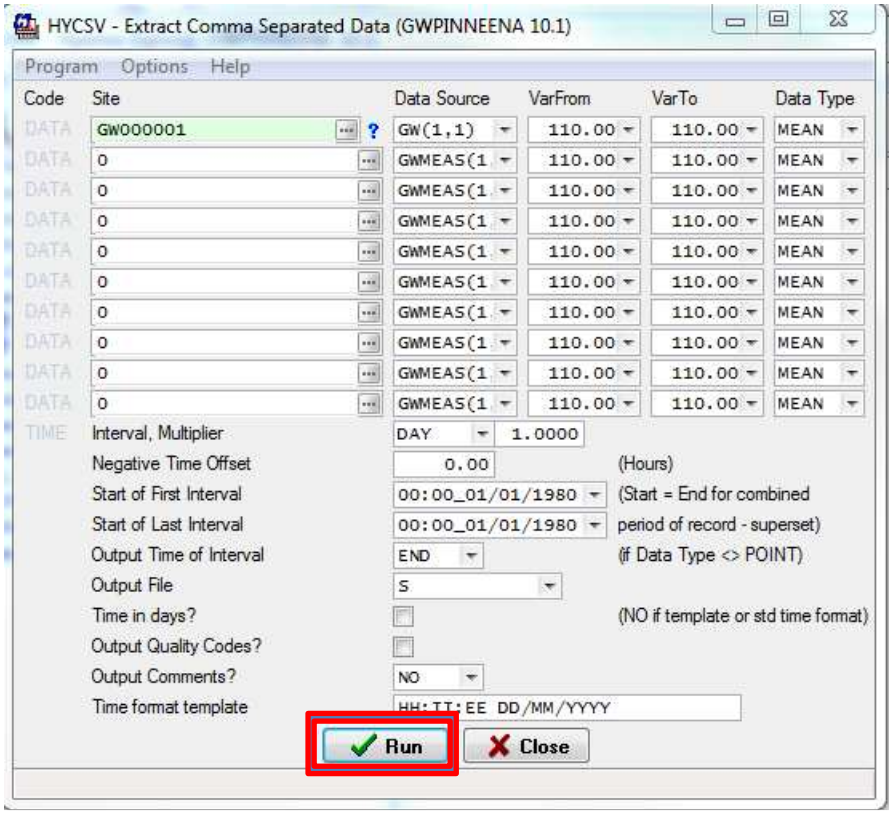
The TS Data Wizard window will now appear. Click on the Next button.



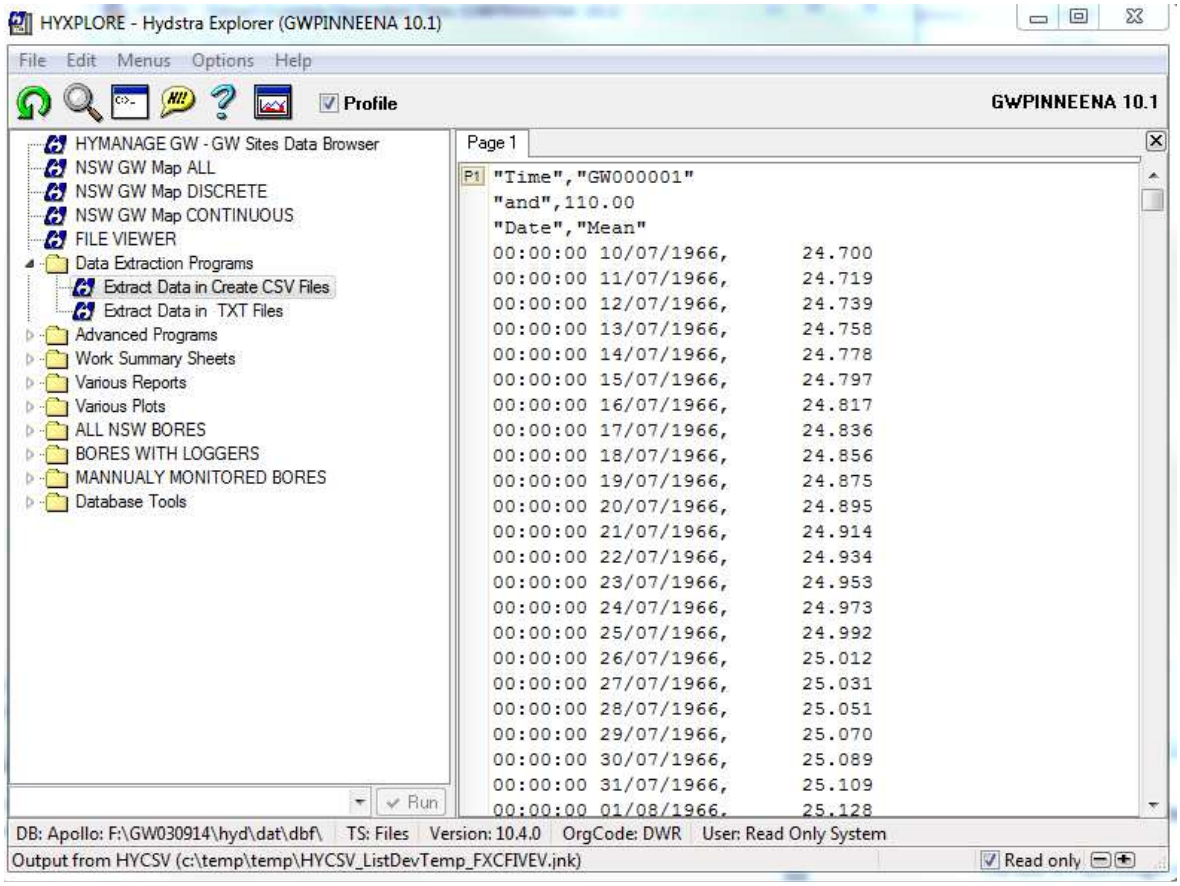
The Data Type will now appear on the TS Data Wizard window. Click on the Finish button.



You will be bought back to the HYCSV program. Click on the Run button.



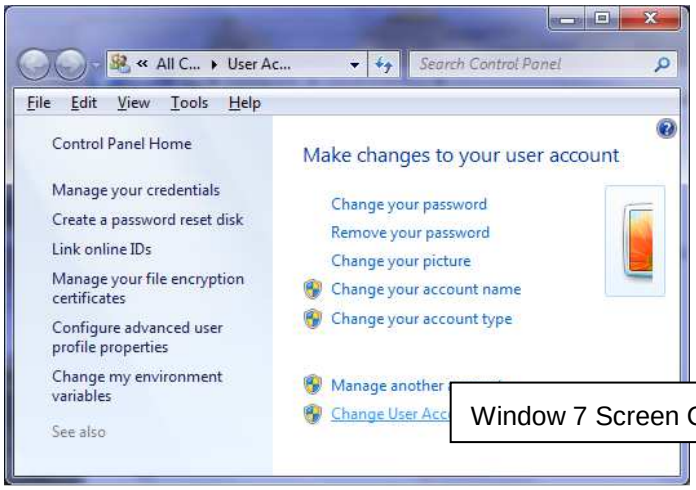
The HYCSV program will now return the data for the GW000001 Site.



You have successfully run a test with the HYCSV program.

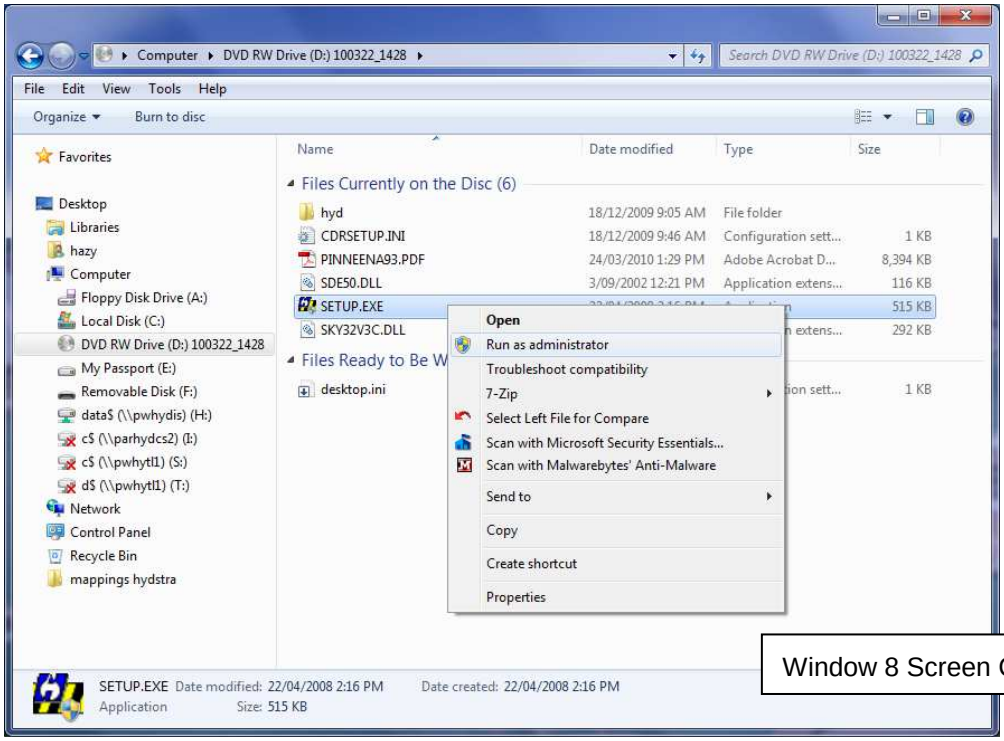
This writes a file to the \Temp\Temp directory. If you are successful in both installing PINNEENA and running the program please ignore the following.

Otherwise, if you are allowed/able to, you suggest that you briefly turn off the User Access Control in Control Panel (in Windows 8 go to Start | Control Panel | User Accounts). Don't forget to turn UAC on again after you have finished the installation and reboot your computer.



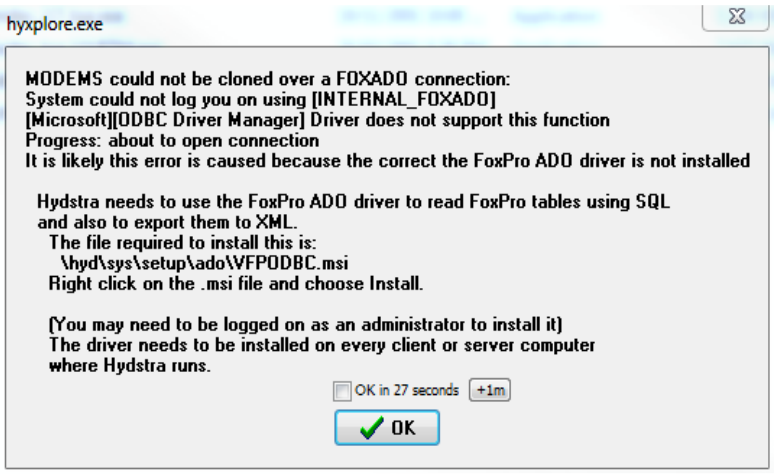
Window 7 Screen Capture

While logged in as an administrator and with the UAC turned off use Window Explorer and right click on the PINNEENA SETUP.EXE file. Then select “Run as administrator”.



Window 8 Screen Capture

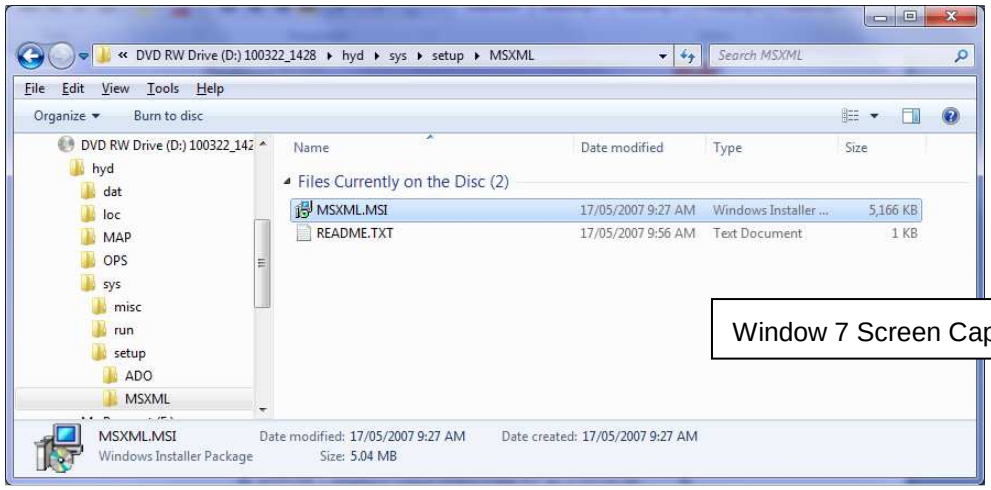
Even with all this other messages may occur which indicate issues with the installation. These messages can include:


hyxplore.exe
MODEMS could not be cloned over a FOXADO connection:
System could not log you on using [INTERNAL_FOXADO]
[Microsoft][ODBC Driver Manager] Driver does not support this function
Progress: about to open connection
It is likely this error is caused because the correct the FoxPro ADO driver is not installed
Hydstra needs to use the FoxPro ADO driver to read FoxPro tables using SQL
and also to export them to XML.
The file required to install this is:
\hyd\sys\setup\ado\VFPODBC.msi
Right click on the .msi file and choose Install.
(You may need to be logged on as an administrator to install it)
The driver needs to be installed on every client or server computer
where Hydstra runs.
OK in 27 seconds
+1m
OK

Open Windows Explorer and browse the PINNEENA DVD. Find and install the file from the CD as indicated ie \hyd\sys\setup\ado\VFPODBC.msi

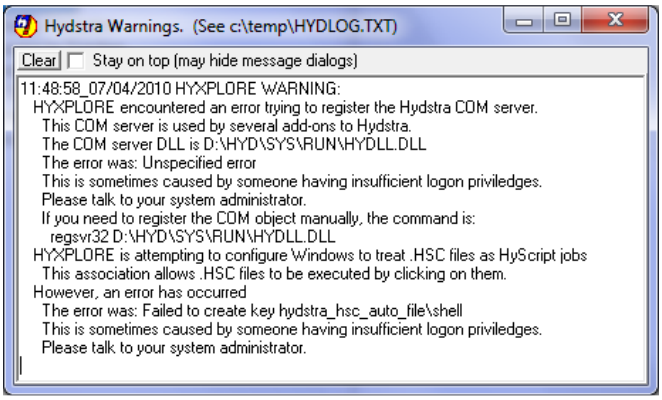
hyxplore.exe
Hydstra experienced some unexpected difficulties validating D:\hyd\dat\ini\HYXPLORE.XML
EOleSysError raised:
Class not registered, ClassID: {88D969C0-F192-11D4-A65F-0040963251E5}
Hydstra needs to use Microsoft XML Core Services 4.0, SP 2
The file required to install this is:
\hyd\sys\setup\msxml\msxml.msi
(You may need to be logged on as an administrator)
OK in 9 seconds
OK

Open Windows Explorer and browse the PINNEENA DVD. Find and install the file from the CD as indicated i.e. \hyd\sys\setup\msmxl\msxml.msi



Window 7 Screen Capture

Another message that may appear is shown below.

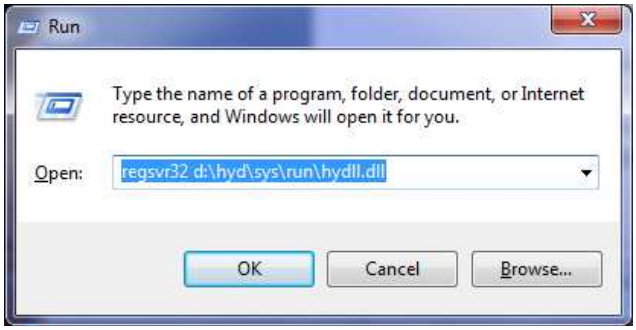

Hydstra Warnings. (See c:\temp\HYDLOG.TXT)
Clear
Stay on top (may hide message dialogs)
11:48:58_07/04/2010 HYXPLORE WARNING:
HYXPLORE encountered an error trying to register the Hydstra COM server.
This COM server is used by several add-ons to Hydstra.
The COM server DLL is D:\HYD\SYS\RUN\HYDLL.DLL
The error was: Unspecified error
This is sometimes caused by someone having insufficient logon priviledges.
Please talk to your system administrator.
If you need to register the COM object manually, the command is:
regsvr32 D:\HYD\SYS\RUN\HYDLL.DLL
HYXPLORE is attempting to configure Windows to treat .HSC files as HyScript jobs
This association allows .HSC files to be executed by clicking on them.
However, an error has occurred
The error was: Failed to create key hydstra_hsc_auto_file\shell
This is sometimes caused by someone having insufficient logon priviledges.
Please talk to your system administrator.

This requires that you select Start | Run... and enter the following text

Regsvr32 d:\hyd\sys\run\hydll.dll

Where d: = the drive letter of your DVD drive

This is shown in the following screen shot:



Also, if you have problems with accessing the Help file contents, ie you see the menu on the left hand side but it returns no content in the right hand panel then please follow the instructions below:

If this occurs you will need to run the CHM.REG file from the DVD in the HYD\SYS\RUN directory.

Again you have to be logged in as an administrator; then use Windows Explorer to find this file on the DVD, right click on it, select run with admin privileges. Again it may be required to do this with UAC turned off.

3.5 Product Support

If you have a question about the PINNEENA DVD or any of the data and you cannot find the answer in this guide, or if you would like to take advantage of the NSW Office of Water ' services to analyse or validate data sets used, please contact the Water Data Systems Team of the NSW Office of Water in Sydney on the following:

Phone: 02 8838 7874

Fax: 02 8838 7854
Email: waterinfo@water.nsw.gov.au

Support for general questions about Groundwater data can also be obtained from the Office's hydrogeological centres in:

Dubbo Tel: 02 6841 7411 Fax: 02 6884 0096	**Tamworth** Tel: 02 6701 9622 Fax: 02 6701 9682
Grafton Tel: 02 6641 6581 Fax: 02 6641 6642	**Albury** Tel: 02 6024 8834 Fax: 02 6041 4223

3.6 Acknowledgement

Kisters Pty Ltd owns the copyright to the HYDSTRA software used on the PINNEENA DVDs. This software is used under license.

4.0 **PINNEENA DATA**

4.1 Data Available

PINNEENA contains the majority of the information stored in the NSW Office of Water's (NOW) groundwater archive. This version of PINNEENA contains the following data in its archive files (this does not include data that has been collected but not yet processed):

- Location ,depth information for approx. 136,900 bores
- Manually monitored water level information for approx. 6500 bores
- Continuous water level data from approx. 1000 bores with loggers
- Drillers logs for over 100,000 bores

The data is from both current and discontinued monitoring sites.

At present NOW's groundwater archive maintains records relating to groundwater bore constructions, lithological and aquifer details, and water level records for monitoring groundwater. The database also maintains other detailed technical records including pumping tests, bore development, geological logs and so on.

4.1.1 Lithology Data

The lithology data presented on the Pinneena GW consists primarily of the driller's interpretation of the physical characteristics of the material that is encountered as the bore is drilled. This description is linked to a depth range.

The majority of bores contain lithology data. At a lesser number of bores there are also geological and stratigraphic interpretations that are available.:

4.1.2 Construction Data

A range of construction details are recorded against each hole and pipe. The details include at hole level things like:

> Drilling methods, drilled dearth, gravel pack details, and bore treatment and development details

And at pipe level details include things like:

> Casing details, slotted intervals and pump tests details.

4.1.3 GW Water Level Data

Examples of groundwater monitoring sites are shown in Figure 10 below. What is typically recorded at a site is the depth below the measuring point or from bores in the Great Artesian Basin the bore pressure is measured.

For the majority of the sites water level measurements are obtained manually. However, increasingly digital logging and sensing equipment is being used to measure much more frequently than was possible with manual measurements. As well at a number of sites this data is being telemetered to a central location to be made available in near real time.

At most sites with water level data while what is measured is the depth below the measuring point this data can be converted to depth below the surface and also to level in metres AHD.

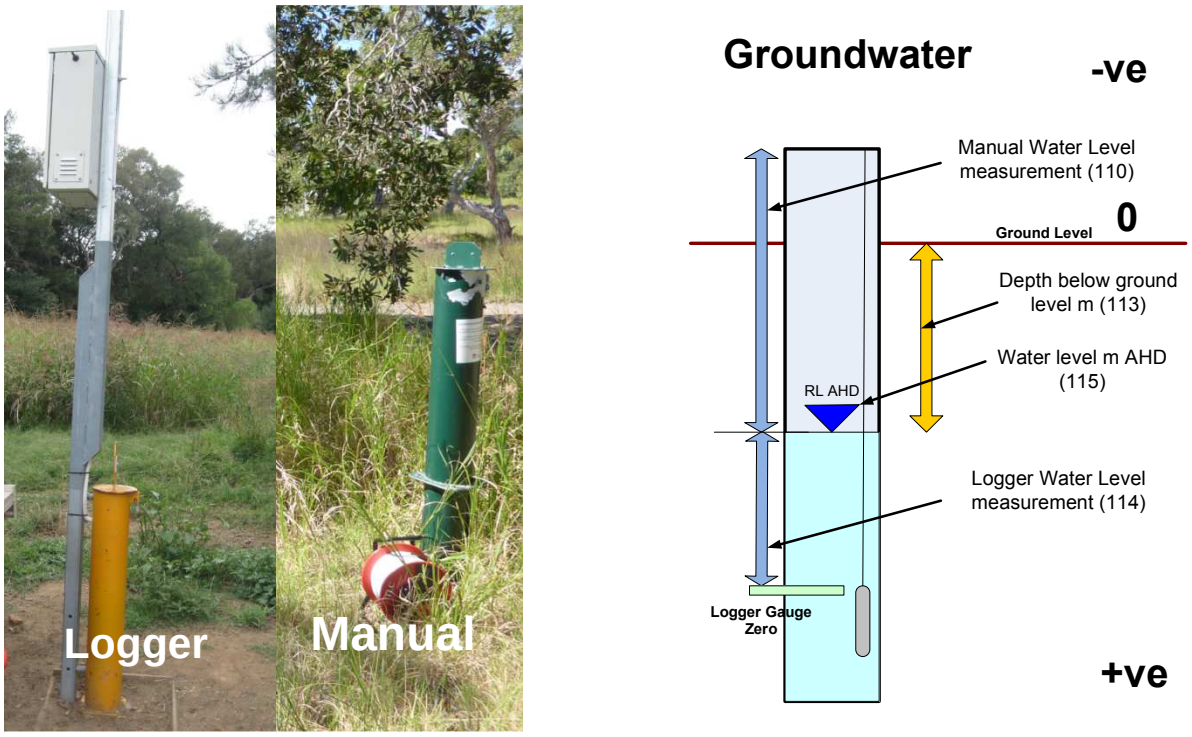


Figure 10 Groundwater level measurement

4.2 Key Concepts

There are a number of things that you must know before you can access the data from most programs on Pinneena GW

4.2.1 Site Location

All monitoring sites operated by NOW are allocated a unique site number.

You must know this number to be able to access the site's associated data.

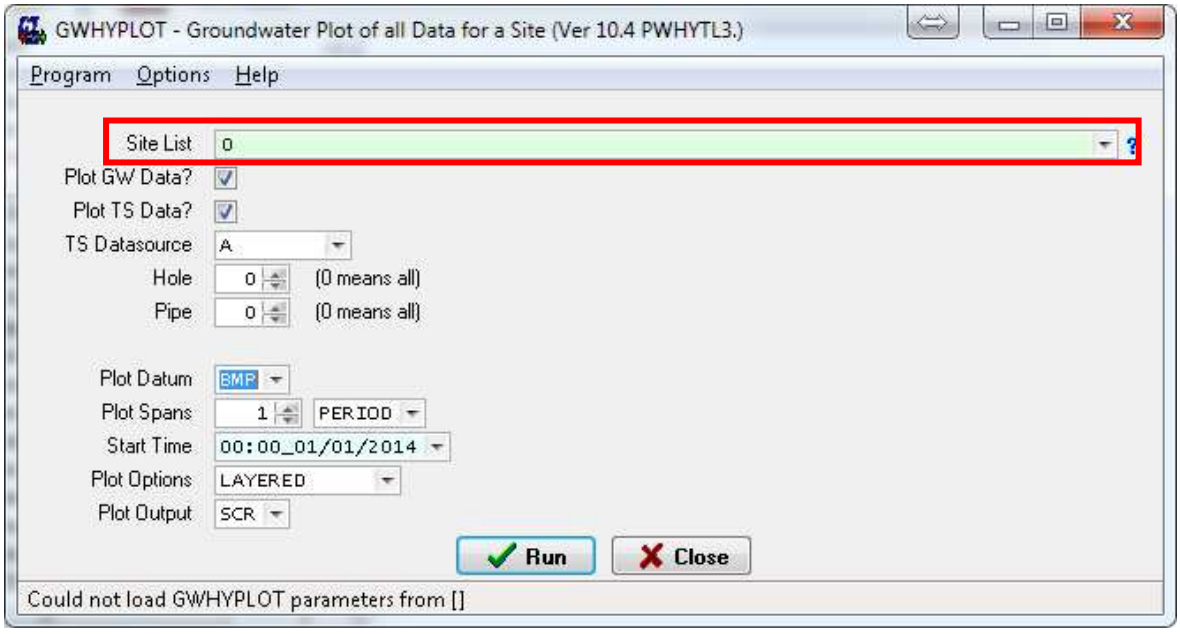


Figure 11 Sample Pinneena GW Program Screen – Site Location

There is no information associated with a Groundwater monitoring site number unlike surface site numbers which indicate what river basin they are in. The numbers are allocated somewhat sequentially in order of registration from any part of the state.

All groundwater site numbers follow the same pattern:

GW012356 – ie the GW identifier and 6 integers

4.2.2 Data Type

Two type of data are provided on this DVD manual measurements, predominantly water level, and time series measurements which include water level, EC at 25C water temperature and bore pressure. The data comes from two separate locations and needs to be accessed differently.

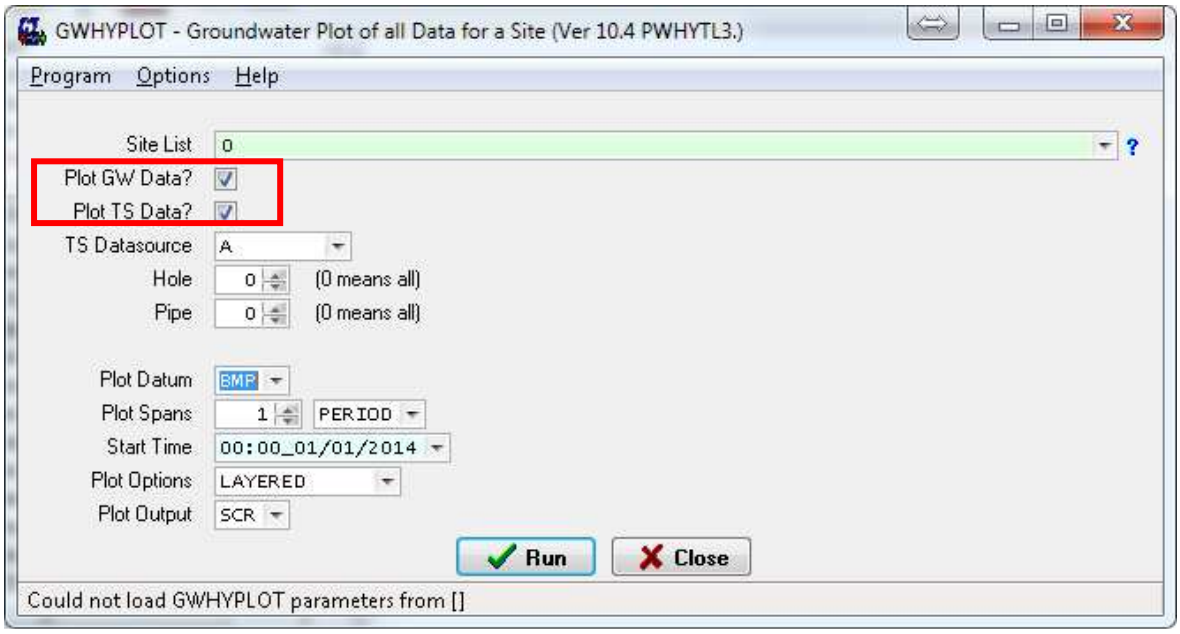


Figure 12 Sample Pinneena GW Program Screen - Data Type

Time series data comes from compressed binary files while the manual measurements come from databases. The PINNEENAGW system will handle accessing and using this data for you but you need to which data it is that you want.

4.2.3 Data Source

A data source is a means of telling the PINNEENA programs where to get time series data from. It is both a powerful and complex tool but happily the majority of users will only ever use a quite small number of those sources available.

The types of data sources currently supported are:

- Time series data files,
- Time series data in non-standard directories
- Data from various database tables within Hydstra,
- Data from various database tables from other systems, applications and types of databases
- Constant values,

In PINNEENA GW

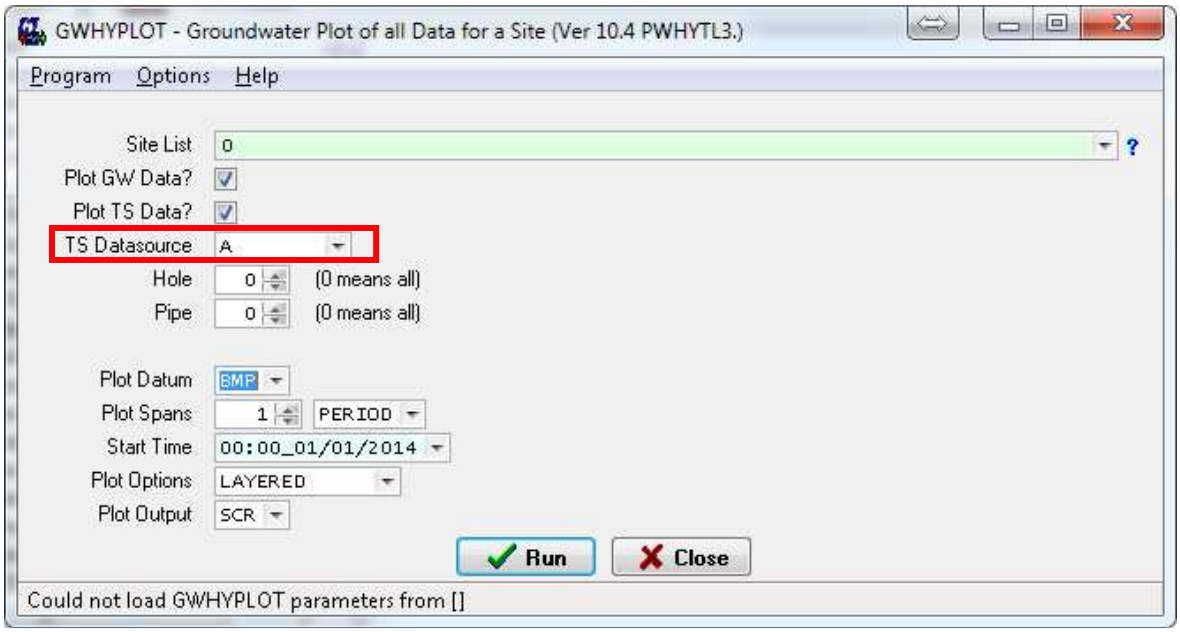


Figure 13 Sample Pinneena GW Program Screen - Time Series Data Source

4.2.4 Bore Identification

The NSW office of water is somewhat unique in that it operates a site-hole-pipe concept for monitoring bores.

A monitoring site can consist of multiple holes and pipes The hole number; pipe number; and interval/slot/screen number are ALL in sequence from shallow to deep. This is shown in Figure 14

For some programs it is essential that you know and specify which hole/pipe you are looking at

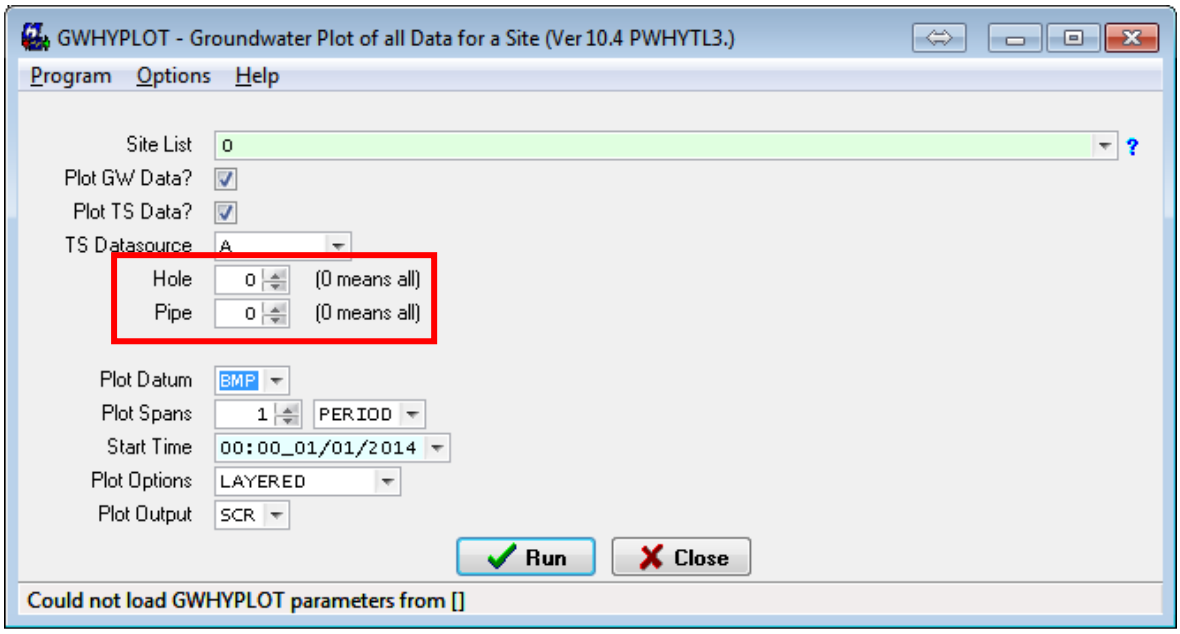


Figure 13 Sample Pinneena GW Program Screen - Hole and Pipe

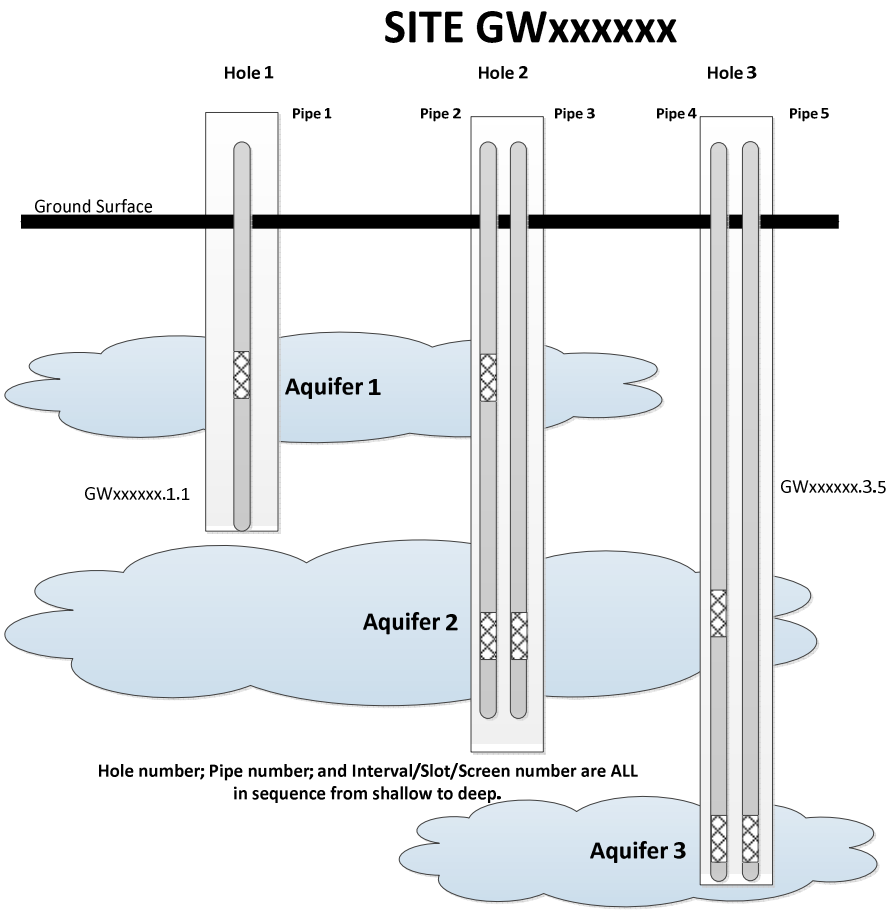


Figure 14 Site Hole and Pipe Concept

4.2.3 Output Destination

PINNEENA GW has the ability to send data to many locations and in many formats.

4.3 Other Useful PINNEENA GW Concepts

While as much as possible has been done to hide some of the complexities of data discovery and data reporting there are still a number of other concepts that should be understood before attempting to use some of the more complex tools available on PINNEENA GW.

Most of the following concepts apply primarily to Time Series data and those users familiar with PINNEENA CM should have already been introduced to them.

4.3.1 “Continuous” Data

While this is not the most common type of data stored on the PINNEENA GW DVD it is still important. It should be recognised that the name is something of a misnomer in that the data as stored is not continuous rather it is digitally sampled at regular enough intervals to allow an accurate representation of the continuous trace of the data.

With the advancing technology, analogue devices such as a chart recorder, made it possible to continuously record the hydrometric processes as they occurred in nature.

However to store this continuous data in computers, it was then necessary to sample it a discrete intervals, ie to digitise the data.

These intervals were chosen so that the data points extracted were able to accurately represent what had occurred in the continuous process. With digital data loggers being used today, this sampling is done automatically. Typically on NSW streams, the recording interval is between 5 - 15 minutes while in groundwater bores the sampling interval is most commonly 60 minutes.

The following plot shows the data displayed using the LINEP (or line and point) option from the HYDSTRA program HYPLOT. Typically the data points are at 15 minute intervals. You may notice some periods where there are no points. This is a feature of HYDSTRA. Where many points fall on a line only the start and end points need to be stored. Any information between these two points can be interpolated. Removing the points compresses the data file size and speeds operation of the programs.

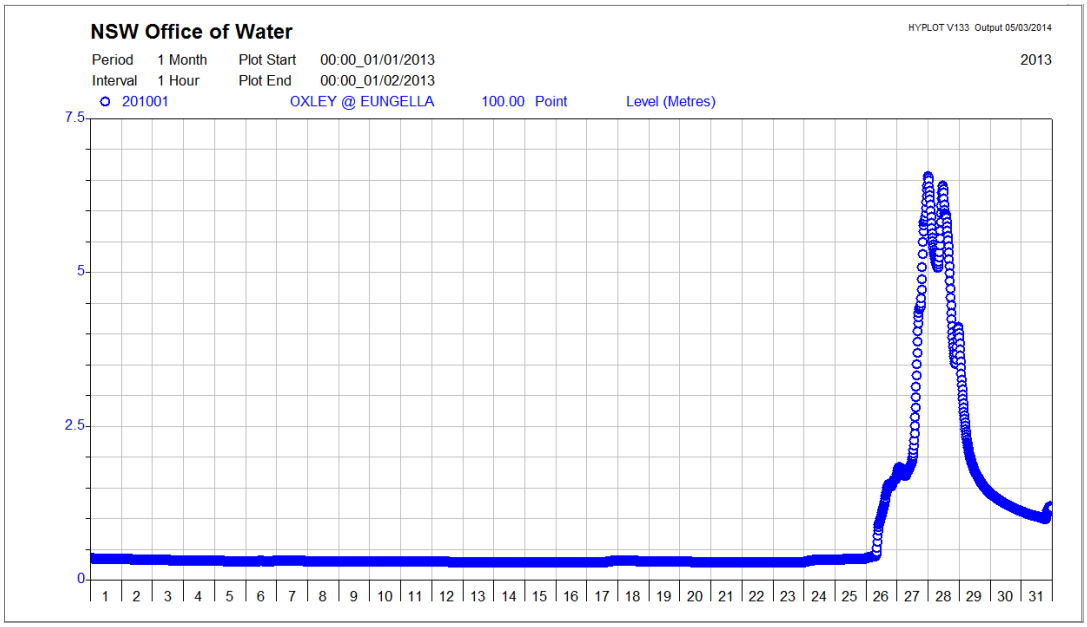


Figure 15, Graph showing the Data Points as stored

4.3.2. Time Series Variable Numbers

Many different types of data types can be collected at one site. To distinguish these different types of data they are allocated unique “Variable Numbers”, and many different “variables” or types of data for the same site are held in a single data file. Common variables available on PINNEENA are:

Stored Data – raw data as collected from the field

10.0	Rainfall	(millimetres mm)
110.0	Water level below measuring point	(metres m)
121.0	Bore water barometric pressure	(kilopascals kpa
2010.0	Water Conductivity	(microsiemens/cm @25C)
2012.0	Uncompensated Conductivity	(microsiemens/cm)
2080.0	Water Temperature	(degrees Celsius)

Other common Variable Numbers which are not stored but are used frequently and are computed on demand by programs within PINNEENA include:

Computed Data – calculated from the raw data

113.00	Bore Water Depth below ground	(meters m)
115.00	Ground Water Level in AHD	(meters m AHD)
2010.0	Water Conductivity	(microsiemens/cm @25C)
2169.0	Salinity (TDSalts)	(Milligrams per Litre)

Note: It is now standard practice to record uncompensated EC (2012) at a site as well as the temperature (2080). Combination of these two pieces of information in conjunction with knowledge of the ions present in the water produces the standard report variable Electrical Conductivity at 25C (2010). Prior to 2008 it was common practice for this data to be combined in the logging device and just a value for electrical Conductivity @ 25C to be stored.

A full list of variables is available from the Variables Database in the HYDSTRA menus.

4.3.2 Variable Conversion

Most of the programs on PINNEENA ask for a **VarFrom** and a **VarTo.**

This is so that the desired data type can be selected (VarFrom) and this data can then be displayed “as is” (VarFrom = VarTo) or converted to something else (new VarTo number as shown above). The conversions will be made based on the stored conversion factors and relationships available for the original data.

The most common conversion is from 100 to 141, ie convert water level in metres to discharge in mega litres per day, which is calculated by looking up a rating table. A table of the common conversions is shown below.

Common Conversions

VarFrom (Stored Data)	VarTo (Computed Data)
110 Ground Water Level (m)	113 Bore Water Depth below ground (m)
110 Ground Water Level (m)	115 Ground Water Level (m AHD)

Note: These conversions will only produce data if:

a) all the appropriate stored data is available

b) the quality code is sufficiently high to allow data to be displayed

c) appropriate look up tables exist for the desired periods

4.3.3 Quality Codes

So that data users can know whether the data they are using has been measured or estimated and whether they are the actual or adjusted readings each data point stored in a site’s data file has a quality code associated with it. These codes are to assist modellers with quantifying model uncertainty; resource managers to know how close the recorded value is to a fixed reference, etc.

When collecting the data various forms of a fixed reference are used to verify the veracity of the data.

The fixed reference for water level may be a gauge height from gauge plates installed in the river bank which has been levelled to a recognised benchmark. For a water quality parameter a value may have been measured by a portable instrument, which has been checked against a traceable standard.

As well, manufacturers generally specify accuracy in terms of a percentage of the full scale range of the equipment, rather than specifying a standard error. Their calibration procedures require that all test readings are within the specified tolerances, and instruments are rejected if they do not meet specifications.

Thus, provided that instruments are calibrated regularly according to standard procedures, and that calibration check indicate results are within manufacturers' specification, quality codes 1,3,5,7,9 can be interpreted to indicate that results are within a 95% confidence interval of the true value as far as instrument calibration is concerned.

Quality codes in the range 2,4,6,8,10 are for data that are adjusted from the value read by the sensor. These quality codes can be extracted to digital files along with the values.

The Print Codes associated with quality codes are shown on printed reports, but not on graphical outputs.

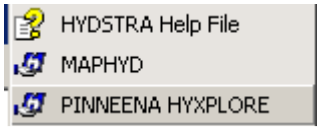
Note: When undertaking data analysis using the HYDSTRA programs data with quality codes greater than 150 are automatically discarded.

Also many of the data conversions involve combining multiple quality codes. For example computed flow data is a combination of height and rating tables, each of which have their own quality codes. The resultant quality code of the computed flow is the worst of the height and ratings.

The full list of Quality codes used by NOW are shown in Appendix C.

5.0 OPERATING PINNEENA

After you have installed PINNEENA GW, four options will be added to the START MENU on your desk top under the PINNEENA GW 10.1 option:



1 **HYDSTRA Help File** online help for operating HYDSTRA programs

2 MAPHYD, a spatial, i.e. mapping, interface to the data

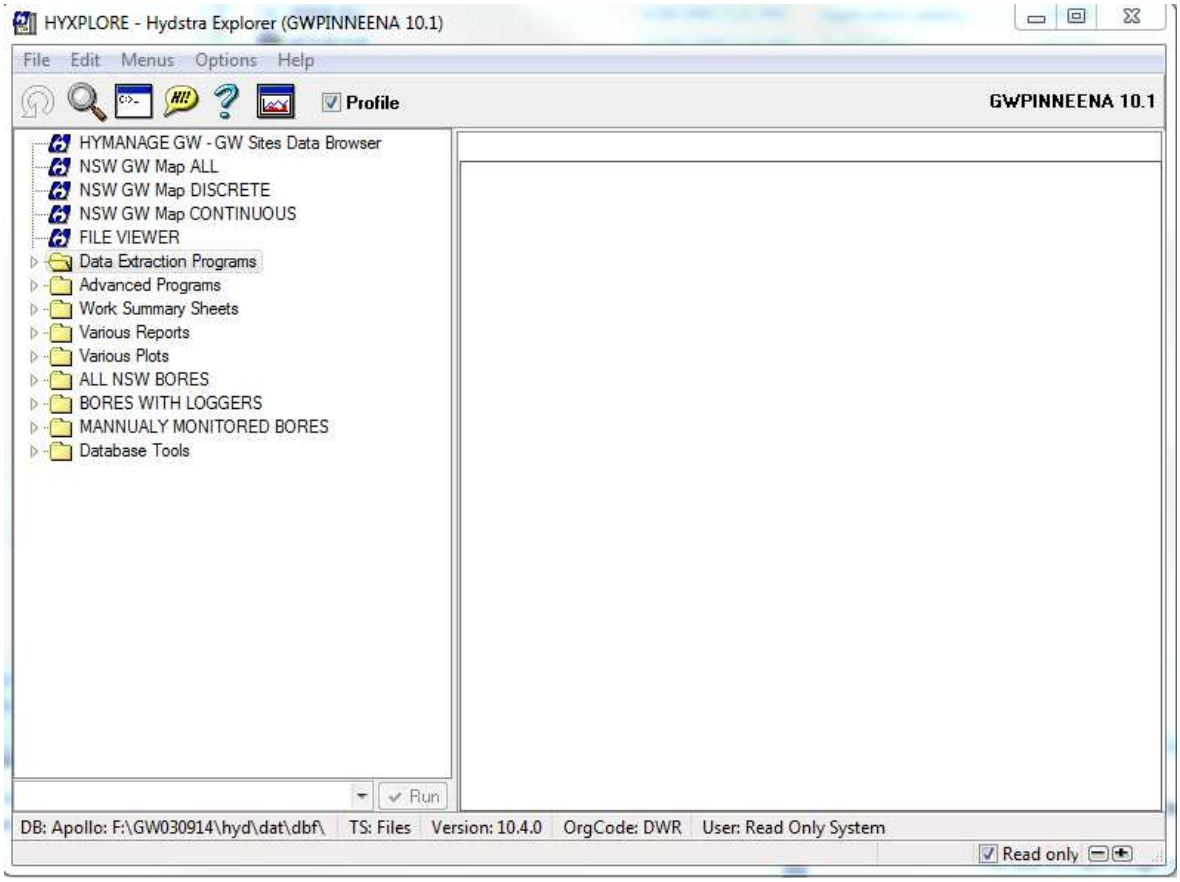
3 PINNEENA Explorer, a windows style menu system

A double click by the mouse on any of these options will start a different PINNEENA/HYDSTRA program or help file.

With the use of the 32bit Operating environment some dynamic libraries are loaded into memory at start-up. This may take a short time to load from the DVD but it will decrease the subsequent loading time for most programs.

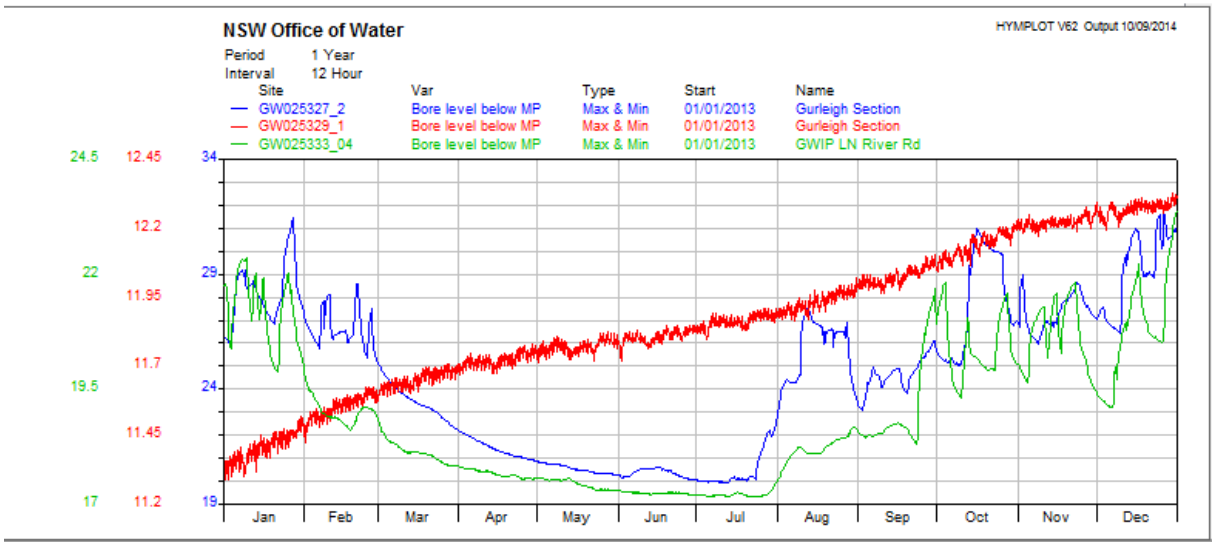
5.1 Using PINNEENA Explorer

When you click on the PINNEENA HYXPLORE option in the start menu a new PINNEENA menu system will be started.



PINNEENA HYXPLORE is a menu program for accessing both the HYDSTRA programs and data files on the DVD and displaying the outputs from reporting and plotting programs. It uses the familiar tree paradigm which is used by Windows Explorer, but with some additional features which provide additional flexibility.

It uses a Windows Explorer style interface to find and run the HYDSTRA/PINNEENA programs and to display outputs. The menus options are controlled by an XML file and while they have been configured for the PINNEENA users it is possible for more advanced users to modify this file in their \TEMP directory to change the appearance of the menus and to add external programs, data files, Perl procedures, etc to the menus. (If you contemplate making any changes a copy of the original menus will always be available from the DVD.)

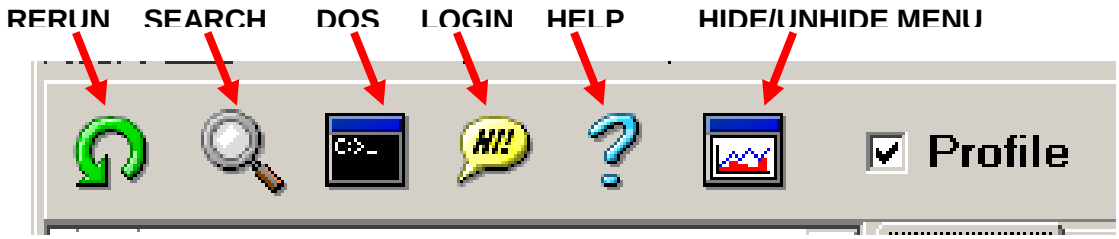

NSW Office of Water
HYMPLOT V62 Output 10/09/2014
Period 1 Year
Interval 12 Hour
Site Var Type Start Name
GW025327_2 Bore level below MP Max & Min 01/01/2013 Gurleigh Section
GW025329_1 Bore level below MP Max & Min 01/01/2013 Gurleigh Section
GW025333_04 Bore level below MP Max & Min 01/01/2013 GWIP LN River Rd
24.5 12.45 34
12.2
22 29
11.95
11.7
19.5 24
11.45
17 11.2 19
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

On the left hand side of HYXPLORE the programs can be accessed in the menu tree by clicking on the folder icon and displaying the options beneath. The Folders are opened by clicking in the + box to the left of the description, or by double clicking on the description itself. Folders are closed by double clicking again, or by clicking on the - box to the left of the description. Folders are of various types, and the behaviour of the folder when opened depends on the folder type. Each folder option is displayed in the tree using a visual icon to indicate its type.

A menu item preceded by a plus sign (+) implies that this item has further sub-menus to follow.

At the lowest level are the programs themselves. Clicking on a program icon will start the program parameter screen (where you control the programs operation). Output from programs appears in the right hand side window of PINNEENA Explore.

A range of shortcuts are also available on the Explorer screen as shown below.



Rerun (Again)	Runs the currently selected menu item, with the same parameters as used during the previous run. The Menus | Rerun menu option and the <F8> key does the same thing.
Search	Displays a dialogue box to search for a HYDSTRA menu item. You may search for any part of a menu item.
DOS	Creates a DOS box in which you can run commands. The File | DOS shell menu option and the <F9> key does it also.
Login	Lets you login and change user IDs, not required for PINNEENA.
Help	Starts up the HYDSTRA help file, at the topic of the currently highlighted program.
Hide/ Unhide	This hides/unhide the menus in the left hand pane to give your outputs greater viewing area.

There are also a range of shortcut keys which will assist you in operating HYDSTRA programs. They include:

[F1] is the help key as discussed above.

[F8] is the rerun key;

> Allows you to re-run the last job. All the parameters from the last time you ran the program are restored and can be used again and/or edited.

[F9] is the Shell to DOS key;

> at the DOS prompt - exit[ENTER] or closing the window will return you to the HYDSTRA menu.

[ALT] [F4] will exit you completely from the HYXPLORE.

[ESC] will take you from the parameter or menus screen to the next menu above.

At the top line of the screen here is located a series of drop down menus, access to which may also be gained by pressing the [ALT] key and the underlined or highlighted character. These options also have shortcut keys so they can be accessed directly. Some of the more common options have been described above including [F1] for help.

6.0 MAP INTERFACE TO DATA

The MAPHYD program provides the easiest way to access to the data and reports on the DVD. All data can be accessed simply by using the mouse.

MAPHYD can be loaded from the PINNEENA Explorer, PINNEENA Menu or alternatively the user can choose to start MAPHYD from the Windows Start Menu entry,

The default map (NSW River Basins) is loaded automatically when the program is started from PINNEENA Explorer. Using the MAPHYD icon from the PINNEENA Start Menu starts the program without a map loaded. The maps then available on PINNEENA are:

1. NSW Macro Plans
2. NSW Local Government Areas
3. NSW All Bores, Monitoring Bores, Manually Monitored Bores
4. NSW Rivers

To change to or select another map use the **File** menu option, choosing **Open** … and then selecting the map of your choice. This map will load for the current session only. The default map cannot be changed.

On the maps the user can move around the state, panning or zooming into areas of interest.

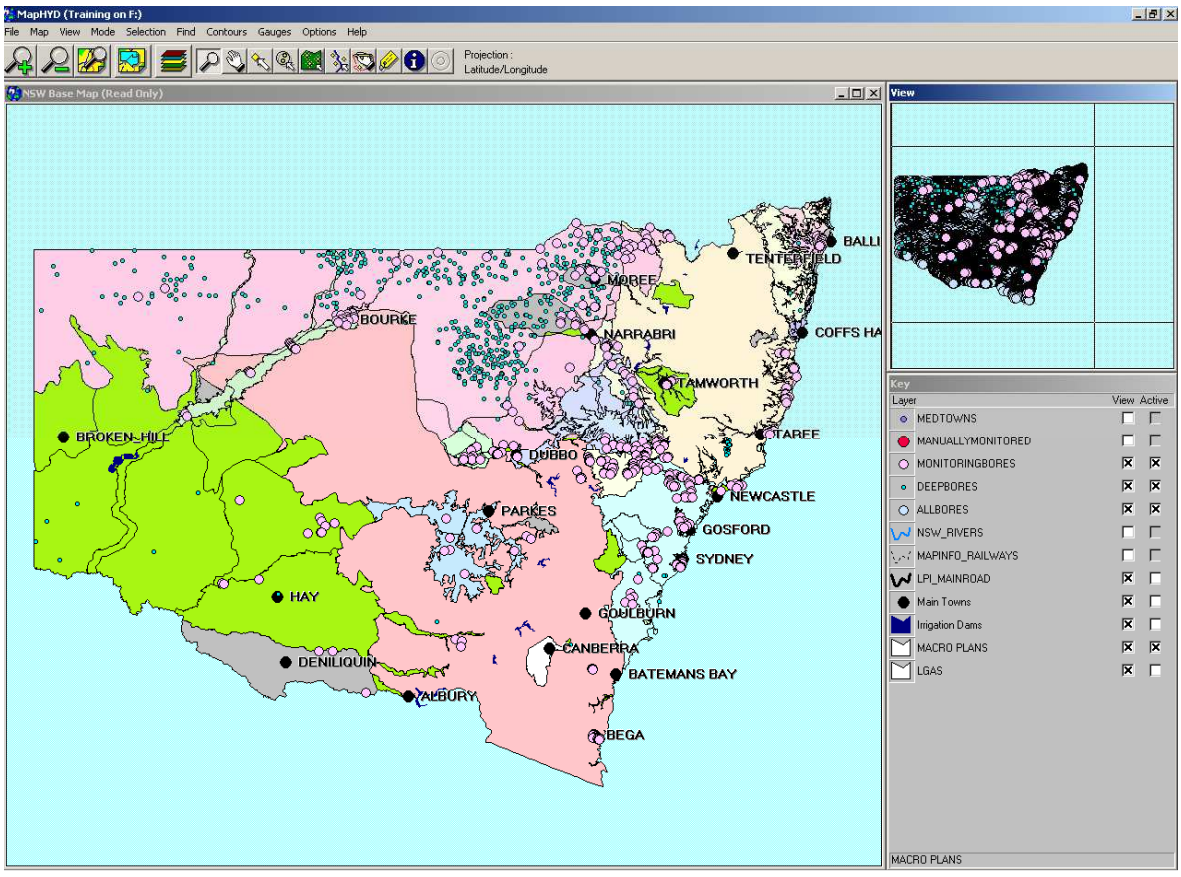


Figure 8 – View of Various layers in MAPS

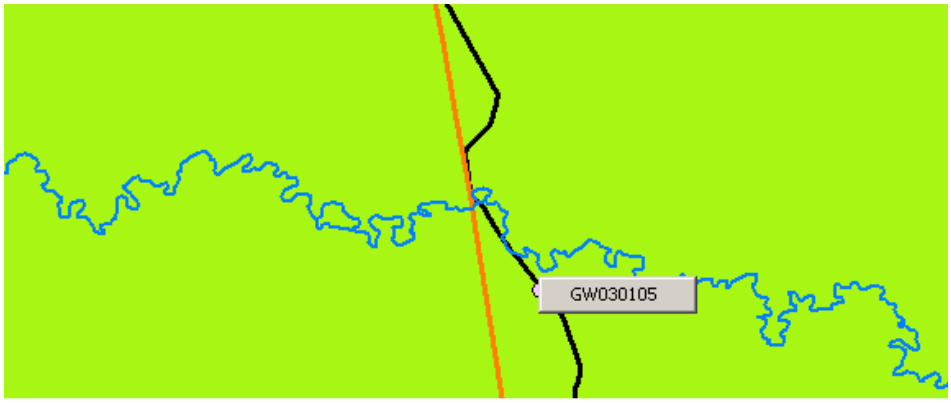
6.1 Using the map to view data

Zoom into the area of interest using either the Zoom Icon and selecting an area in the NSW Base Map main window or selecting an area in the smaller View window.

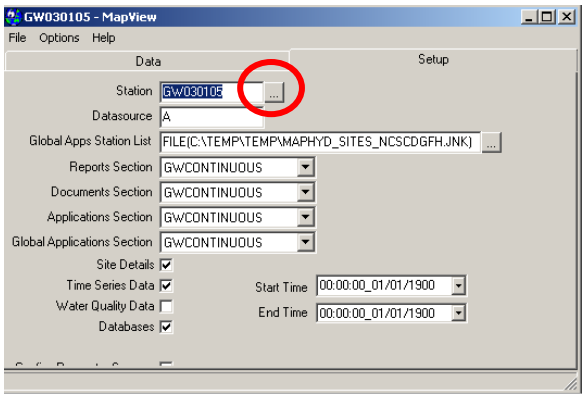
(These actions are explained in more detail in the following section.)

If a Site Layer is viewable and active (ie both tick boxes are selected in the Key Window),

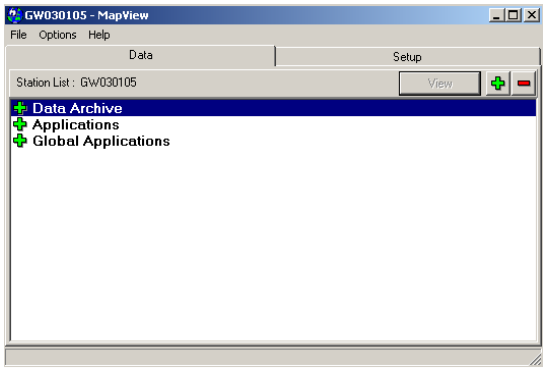
and the right mouse button is clicked when on a site (blue triangle) then a pop-up site descriptor appears on the screen with the site number and name.



By right clicking on the this popup a program called MapView is started. This program, allows site-specific interactive of data from this site.

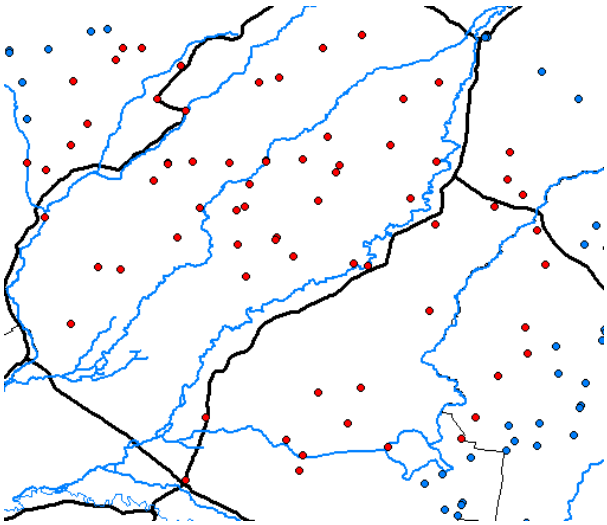


When using Time series data ***'Data Source'*** could be A or PROV. When using Discrete Data Source change the data source to GW(1,1), GW(2,2) etc to



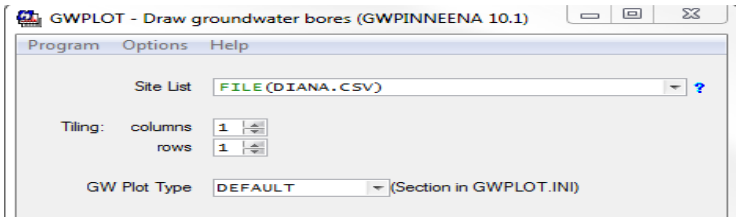
6.2 Using the Map to select groups of sites

As an example NSW GW Map ALL is used in the example. From 'Mode' menu select 'Radius Select' or activate the icon . Move the curser to the centre of radius and expand the dadius to the required extent. The selected area bores will change to red in colour while other bores remain (blue) in their original colour.

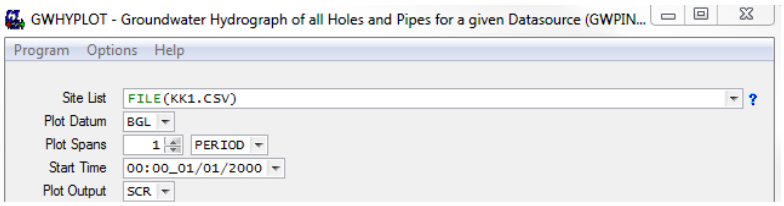


Goto ' selection' and click the Save selection to File/Table. This will be automatically saved under c:\temp directory. For example name the file as 'sample.txt'. The sample.txt file will look like pasted below

```
GW004428
GW273224
GW030868
GW007582
GW007581
GW012314
GW012121
GW040966
GW004609
GW014318
GW004367
GW039436
GW004216
GW021262
GW003761
GW038300
```

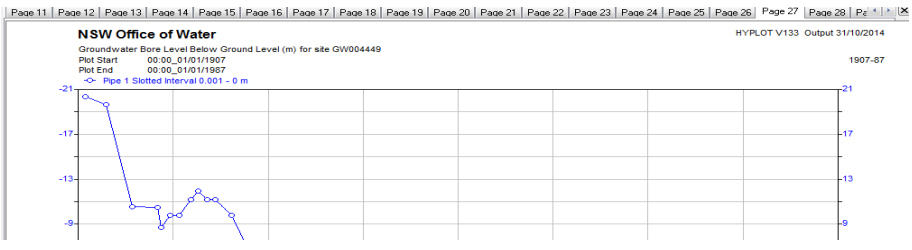

GWPLOT - Draw groundwater bores (GWPINNEENA 10.1)
Program Options Help
Site List FILE(DIANA.CSV)
Tiling: columns 1
rows 1
GW Plot Type DEFAULT (Section in GWPLOT.INI)

For Plots of Bore Construction Diagrams


GWHYPLOT - Groundwater Hydrograph of all Holes and Pipes for a given Datasource (GWPIN...
Program Options Help
Site List FILE(KK1.CSV)
Plot Datum BGL
Plot Spans 1 PERIOD
Start Time 00:00_01/01/2000
Plot Output SCR

For Plots of Hydrographs.

This could be used as a file list for any program calls for 'File List'

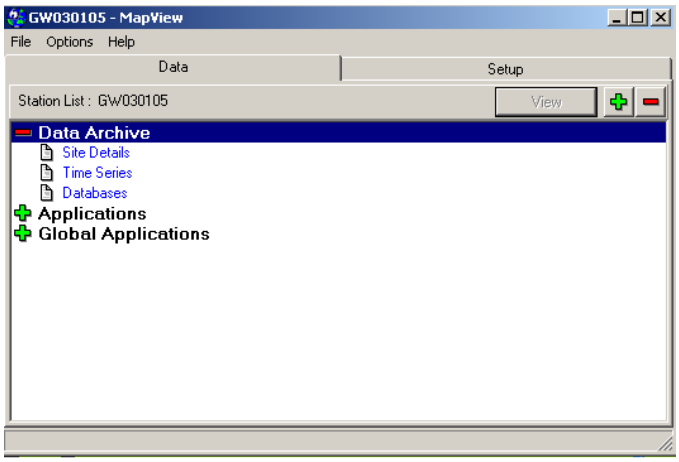

NSW Office of Water
HYPLOT V133 Output 31/10/2014
Groundwater Bore Level Below Ground Level (m) for site GW004449
Plot Start 00:00_01/01/1907
Plot End 00:00_01/01/1987
1907-87
Pipe 1 Slotted Interval 0.001 - 0 m

Multiples outputs will be placed in different pages as shown above

6.3 Data Archive

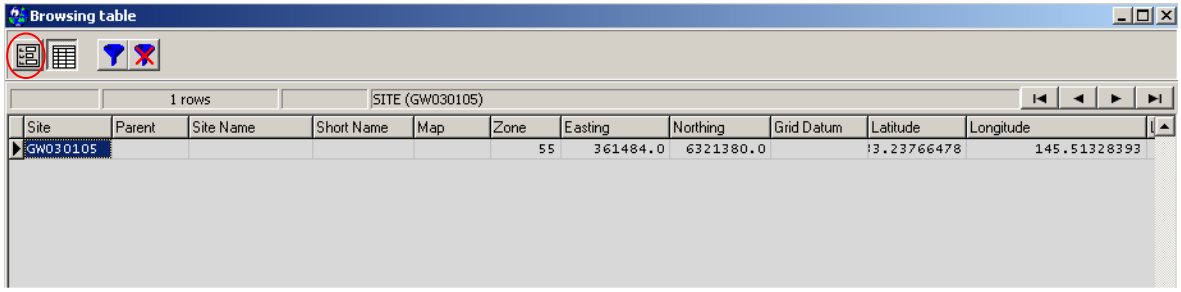
Data Archive will list the types of data available for the site.

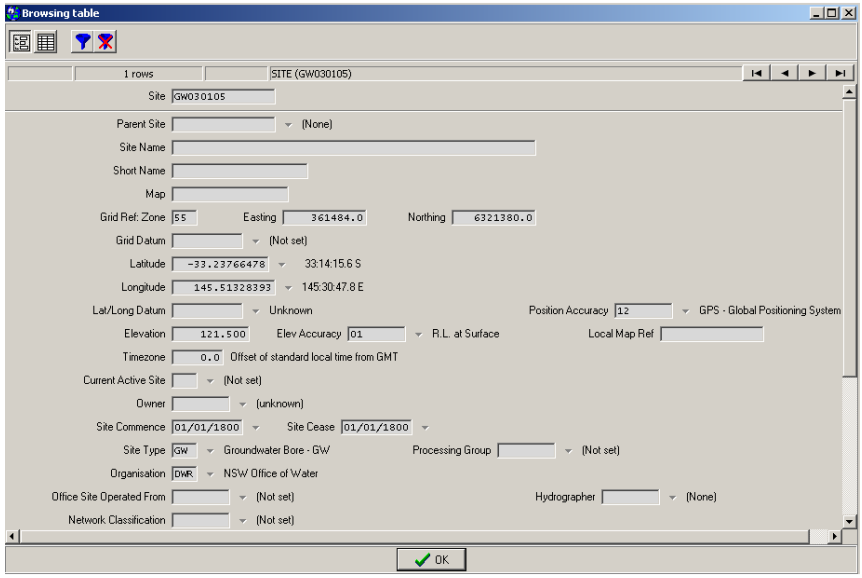
A mouse click on the green Data Archive button or a double click on the menu items



6.3.1 Site Details

Double clicking on **Site Details** will display site details from mthe site database. The site details view may be changed from spreadsheet/table view a to a form view using the **Form View** button.

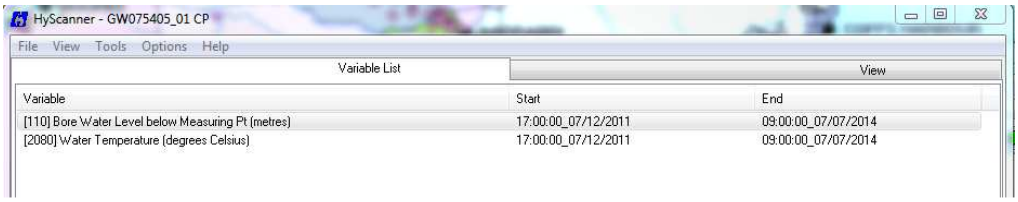



Browsing table
1 rows
SITE (GW030105)
Site GW030105
Parent Site (None)
Site Name
Short Name
Map
Grid Ref: Zone 55 Easting 361484.0 Northing 6321380.0
Grid Datum (Not set)
Latitude -33.23766478 33:14:15.6 S
Longitude 145.51328393 145:30:47.8 E
Lat/Long Datum Unknown
Position Accuracy 12 GPS - Global Positioning System
Elevation 121.500 Elev Accuracy 01 R.L. at Surface
Local Map Ref
Timezone 0.0 Offset of standard local time from GMT
Current Active Site (Not set)
Owner (unknown)
Site Commence 01/01/1800 Site Cease 01/01/1800
Site Type GW Groundwater Bore - GW
Processing Group (Not set)
Organisation DWR NSW Office of Water
Office Site Operated From (Not set)
Hydrographer (None)
Network Classification (Not set)
OK

6.3.2 Time Series

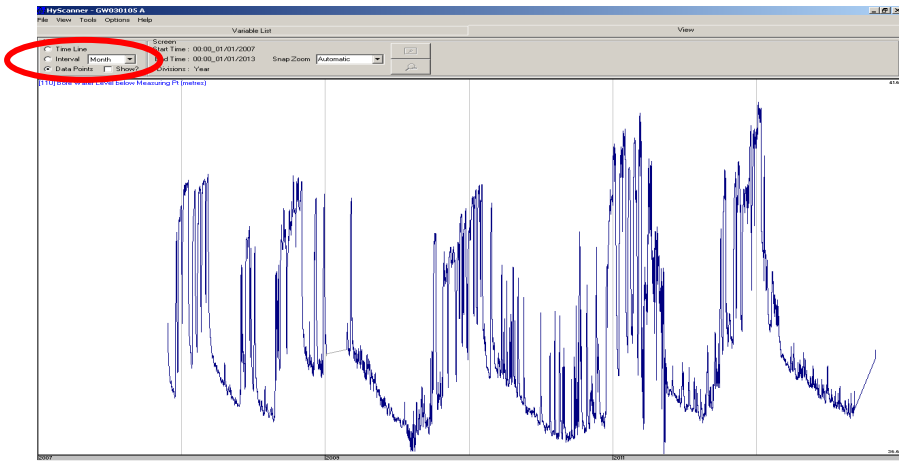
Double clicking on **Time Series** will show a list of data stored by variable for the nominated site. This uses the program HYSCANNR The program is also available from **the Data Management** option.

This parameter screen gives the user a list of the data available for the nominated site. One or more variables may be selected for viewing by holding the 'Control Key' down when clicking the appropriate data line with the mouse.

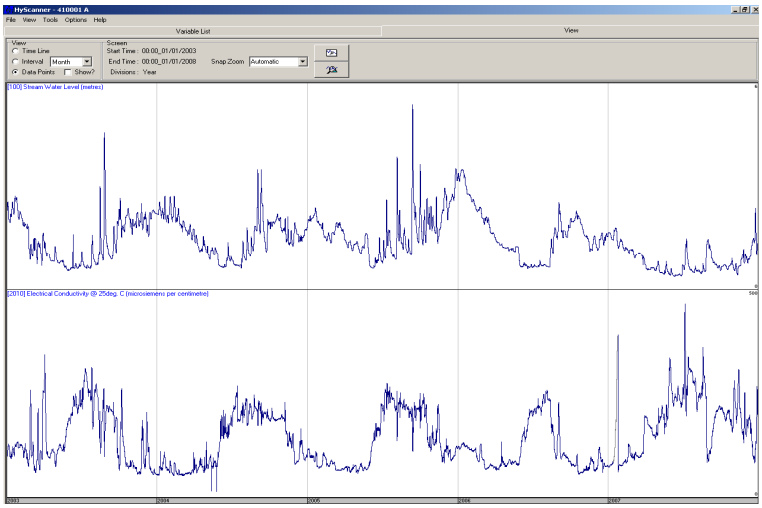


The following screen shows the 'time line' of the data. The period of record shows the start and end of the data, but does not indicate whether the data is continuous or not. The time line will show if there are any gaps in the data.

By selecting **Data Points** or **Show**, the data itself can be displayed.



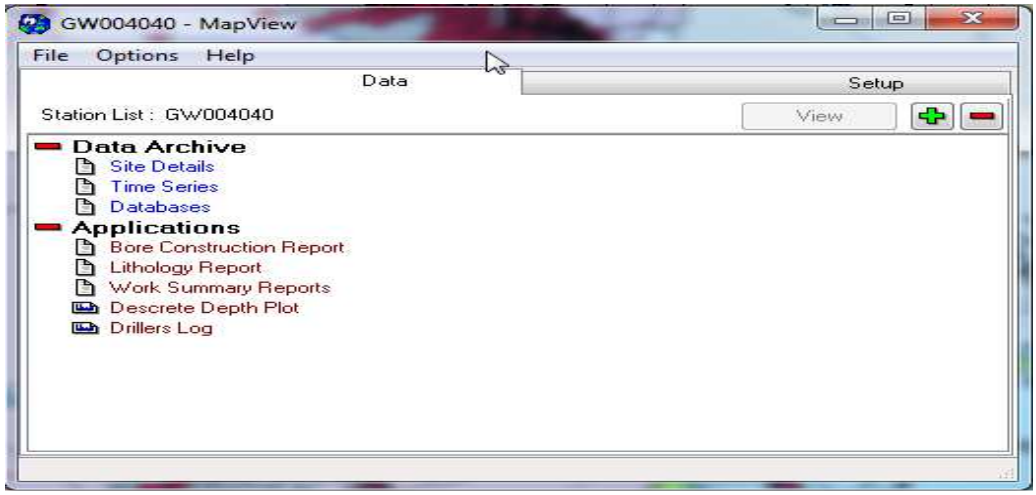
Selection of **Interval** will show the data at the default interval. The display interval can be changed by clicking on the small down arrow to the right of the interval.

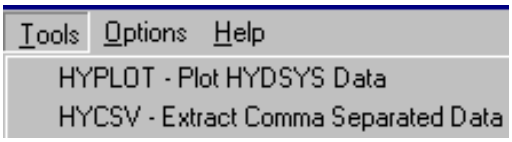


The user may also zoom into the period of interest by moving the cursor to the start, pressing left mouse button, pulling along the horizontal line up to the end point and then releasing it.

6.3.3 Outputting Data from MapView

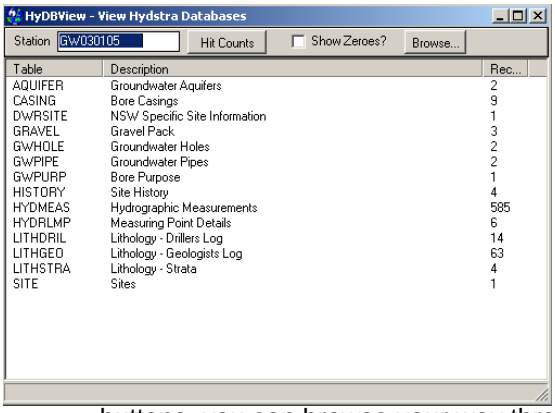
A right mouse click on the trace will display a list of HYDSTRA programs that are available for use for that individual trace.





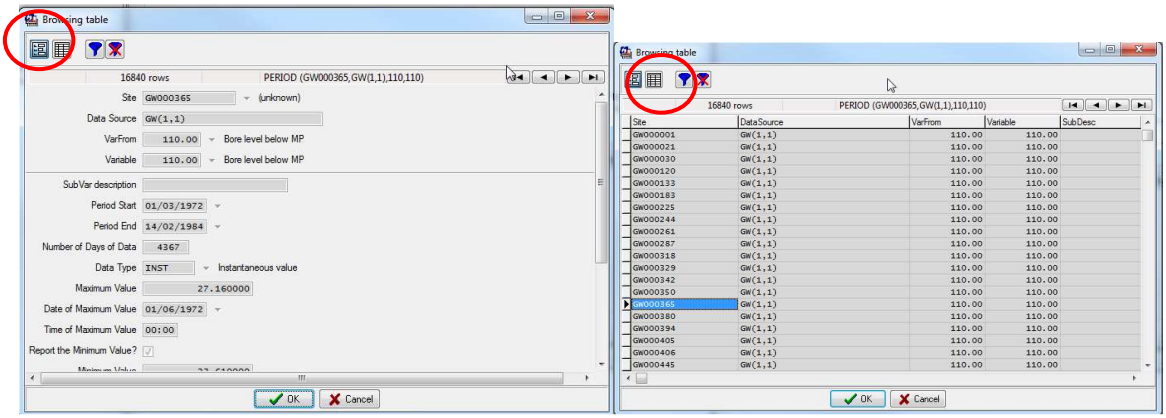
If you select one of these, HYDSTRA will automatically complete the parameter screen for you using the start and end points of the window for the period. You can also use the Tools menu to select one of two programs that will operate on all traces you have selected. For example in the previous page we were displaying stream height and electrical conductivity. Using the HYPLOT option from the Tools menu we would get the parameter screen for a plot with these two traces.

6.3.4 Databases



Returning to the MapView interface, double clicking on **Database** will display the HyDBView screen. Here you can select the database you wish to view. First choose a path under **System** and the click **Hit Counts.** HYDSTRA will check all databases in that system and display those with data for the nominated site

By double clicking with the mouse or clicking the **Browse** button, select the database you wish to view. Then using the mouse and the four arrow buttons, you can browse your way through the database.

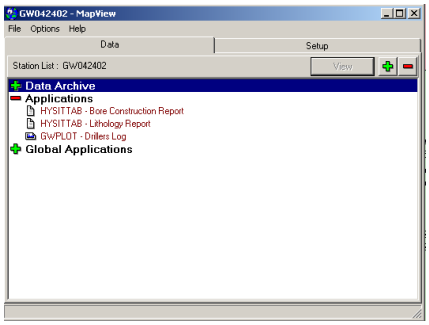


The two left-hand buttons will toggle from a form view showing one record per screen to a table view listing the records in tabular form as shown on the next page.

When you have finished, click the **OK** or **Cancel** button to return to the database selection screen.

6.3.5 Reports

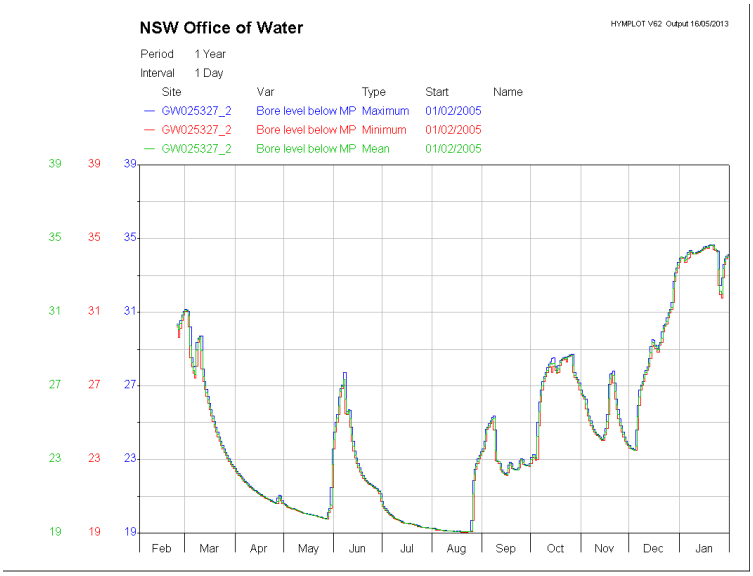
Returning to MapView, under the 'Data' tab you will find a menu option for 'Reports'.



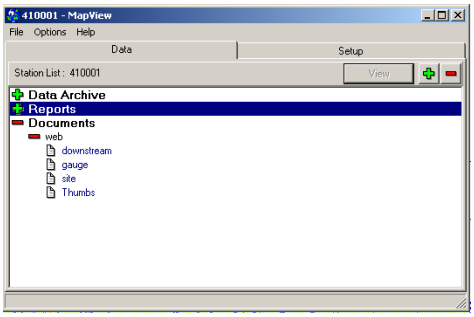
This menu provides access to a range of pre-computed reports which can be viewed by clicking on the report title. The report will be displayed to the screen with the standard HYDSTRA screen options, ie to modify, to print the report or send to the clipboard.

All these reports have been generated using HYDSTRA programs and stored on the DVD to save you having to run the programs yourself. They are a quick way to see what data is available at a site before examining the data in more detail.

Clicking on a report (eg the HYMXMEAN plot) will open that report in the HYXPLORE window.



6.3.6 Documents



It is also possible to view a range of documents (typically photos) associated with the site (if they exist) by opening the documents section.

6.3.7 Mapping Interface Components

The HYDSTRA help system contains a comprehensive explanation of the components of MAPHYD. The following is a quick review of the more useful features.

Menu Bar

At the top of the screen is the menu bar, which provides access to all the functions of the mapping package.

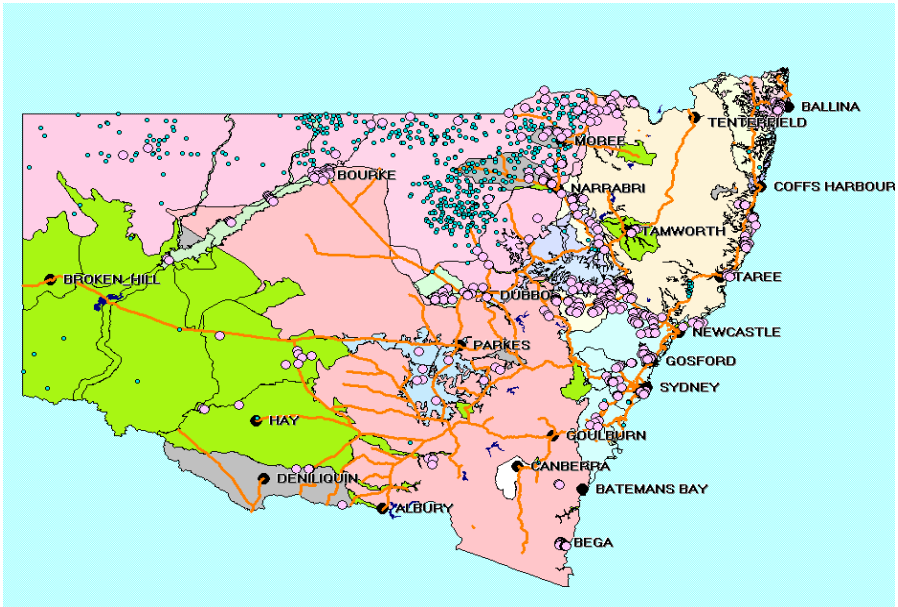
6.3.8 Shortcut Buttons

The shortcut buttons allow quick access to various menu actions. The buttons are explained in more detail in the following sections.

6.3.8.1 Map Window

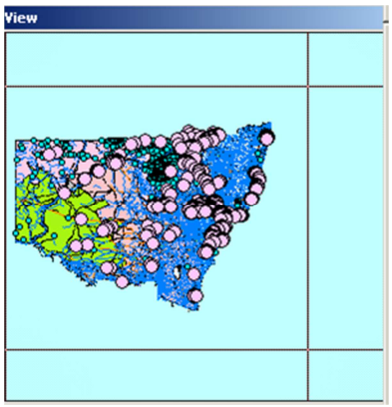
The large window on the left is the map window. It will display the map name in the top left hand corner.

This is the active map viewing area where all connections to the data are made.



6.3.8.2 View Window

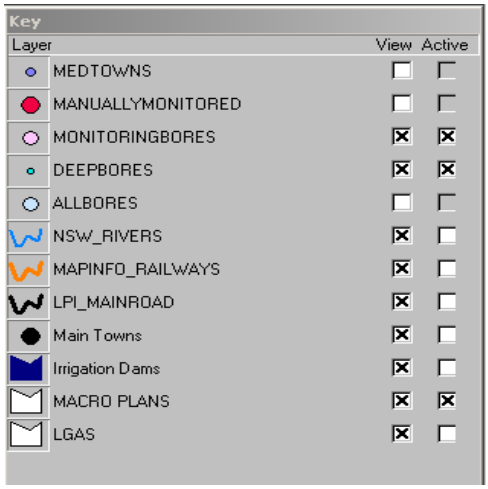
The small window on the right is the View Window. It will always show the whole area of the map



Aa rectangle indicating the current zoom position in the Map Window will appear when you have zoomed in on the main window to indicate your position.

The mouse cursor is always in Zoom mode in this window. The View Window may be used to move quickly around the map.

6.3.8.3 Key Box



The **Key Box** displays a symbol and some descriptive text for each map layer.

Alongside these are check boxes for each layer. These are a shortcut to the layer's **View** and **Active** attributes.

A right mouse button click on the key text presents a pop-up menu that allows changes to be made to a layer's display options. This will be discussed in more detail later.

6.4 Pan and Zoom

6.4.1 Movement Buttons

The first 2 buttons with the magnifying glass icons are the **zoom** buttons. Pressing one of these will move the viewer in the given direction The current zoom step is 25%, which will move the map by 25% of its width in the main Map Window.

The **hand** button will allow the user to grab the map and move it in any direction..

Zoom Right Out - Returns the main map window to the original zoom that the map opened in. Ctrl-O is a shortcut.

Last View - Returns the main map window to its previous zoom. Alt-BackSpace is a shortcut.

Layer Control - A shortcut to the map's Layer Control dialog box. Ctrl-L is a shortcut.

6.5 Mouse Functions

6.5.1 Mode Box

The Mode Box contains a group of ten buttons that select the type of action a mouse click will perform in the Map Window. The modes in order from left to right are:

Zoom Click in the Map Window. Drag the mouse until the rectangle contains the parts of the map you want to see. Release the button, and the Map Window is zoomed in on the required portion. To zoom in to a region, make sure that the region's layer is active (in the **Key** box) and simply click on that region (no dragging). The same applies to line objects.

Move Hand Explained above

Point Select Selects point objects, e.g. sites. Refer to the section on **Selection Mode** in the **Selection** menu details.

Radius Select selects points in a circle.

Region Select selects points inside a region.

Line Select selects points within a given distance of a line.

Freehand Region Select allows a region to be drawn on the map and points inside this region will be selected.

Label The "top" object is labelled, i.e. the object in the uppermost layer under the mouse click.

Info The "top" object is found and its layer and label are displayed in a dialog box.

Move Point would allow point objects to be moved on a non DVD system

6.5.2 Status Line Controls

At the bottom of the map there are several controls:

Hints If this box is checked then all buttons, edit boxes and other components will display little pop-up hints when the mouse cursor moves over them. This is very helpful when you are learning to use the program.

Drawing If ticked, the map drawing is displayed as it goes (i.e. builds the picture on the screen) un-ticked it will build the picture off-screen and just present the finished map.

Zoom Indicator In the lower left corner is the zoom indicator. It shows the approximate distance (in kilometres) between the left and right edges of the map in the map window.

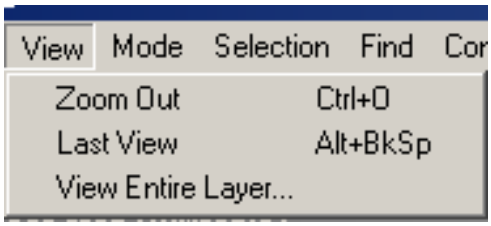
Position Indicator Whenever the cursor is in the map window, its approximate position is displayed in the middle of the bottom line.

Mode Indicator The current mode of the mouse's left button is displayed at the bottom of the screen.

Selection Indicator Next to the mode indicator is another window which displays the number of currently selected points.

6.5.3 View Menu

The view Menu provides options for moving about the main window.



Zoom Out This command zooms out to the extents of the View Window. <Ctrl/O> is a shortcut.

Last View Returns the main map window to its previous zoom state. Alt-BackSpace is a shortcut. **View Entire Layer** This option presents a list of layers. Select the layer you wish to zoom to and the main map window will zoom in or out to contain all of the desired layer.

NOTE : this has no effect on that layer's maximum zoom - so you may find that the map zooms out beyond the layer's maximum zoom.

6.5.4 Find Menu

The find menu has several options to assist in locating features on the map.

Go to Lat/Long... Allows movement to a known location and predetermined zoom distance. The initial Lat/Long will be the centre of the current map window. The latitude and longitude are displayed in a dialog for manual refinement. The dialog has two "pages" - one for decimal latitude and longitude, and a page for the full degrees / minutes / seconds / hemisphere representation. Either page may be used with equivalent results. When the **OK** button is clicked, the main map window will be zoomed to centre on the requested location, and have the requested zoom distance across the map.

Point Search... Finds a point object by specifying a portion of text. The text could be the whole or part of a gauging site name or number. Each object's label is scanned for this text. The search is case insensitive. If multiple objects are found, a list is presented. Note

that this list also includes the layer name of the object.

Zoom to Line... Presents a list of line objects in all layers. Double click on the line's identifier and the main map window will zoom in to contain the selected line.

Zoom to Region... Presents a list of region objects in all layers. Double click on the region's identifier and the main map window will zoom in to contain the selected region.

6.5.5 Mode Menu

The **Mode** menu indicates the selection method to be used during the selection.

Layers may be temporarily selected or de-selected for any session, just toggle the appropriate **selected** box with a mouse click

Any selection operation adds to the current selection. To restart the selection, chose **Selection|Clear Selection** first. If the **Shift** key is held during one of the mouse-based selection operations (**Select, Radius Select** or **Region Select**) then the selected status of all the newly selected points will be reversed.

6.5.6 Selection

These dropdown menus are used to select individual and groups of sites. Selections can only be made on those layers marked **Active** in the **Key** box eg. current and discontinued sites.

Clear Selection Clears the current selection. All selected point objects are de-selected. **Ctrl-C** is a shortcut.

Browse Selection... Displays a list of all currently selected point objects.

Zoom to Selection Zooms the main map window to display the entire selection.

Load Selection... Loads a list file, e.g. one created by **Save Selection...**, and selects the objects that have an identifier contained in the list.

The full path and file name needs to be specified, including the file extension. If the extension is .DBF, the file is assumed to be a dBASE file. Otherwise the file will be read as an ASCII text file with the one

identifier per line, and the site identifier as the first "word" on that line. An active layer is required. Click on this text box to display a list of selectable layers. The layer name displayed here will be the target of the selection. In the case of a database file, a list of fields is presented. Double click on the name of the field that will contain the object identifiers.

Save Selection... Saves the current selection as a list of the selected objects' identifiers. A dialog box prompts for the name and type of file to produce. Use the **File Type** pick list to chose the type of file to save. If the file type is a database, then a dBASE database file is produced. It has one 8-character field called SITE. Otherwise, the list will be written to an ASCII text file.

Select from Site List... A list of site can be supplied. Each site in the list is searched for in the active site layers.

7.0 OBTAINING HELP

Help for PINNEENA users is available in a number of ways.

1. This document is available as a Adobe Acrobat file for printing from the root directory of the DVD as PINNEENA Mannual.PDF (Is available in http://waterinfo.nsw.gov.au/pinneena/pinneena_gw_10.1_user_guide.pdf)
2. There is an on-line help system for the HYDSTRA programs which is loaded as a separate Start menu item as part of the installation
3. There is on-line help available from within PINNEENA's HYDSTRA menu by pressing <F1>, and
4. There are a range of on-line help features available in each HYDSTRA parameter screen.

7.1 PINNEENA Help

The PINNEENA help (this document) is accessible in a number of ways:

- It is available as a Adobe Acrobat PDF file for viewing and printing in the root directory of the DVD.
- It is available as a help file in the root directory of the DVD.

To read this file you will need a copy of Acrobat reader. Any version will be able to read the file but the latest version can be found at www.adobe.com or at a number of software and shareware related sites. The download is free.

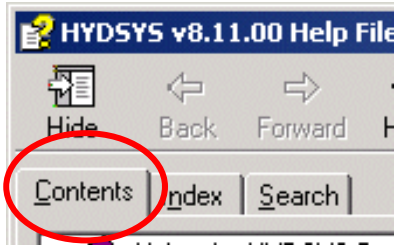
7.2 HYDSTRA Help

A windows help file is available to all PINNEENA users explaining how to use the various HYDSTRA programs.

This can be obtained before starting the program by selecting the Hydstra Help File option in the Windows Start menu the on-line HYDSTRA help manual will be made available.

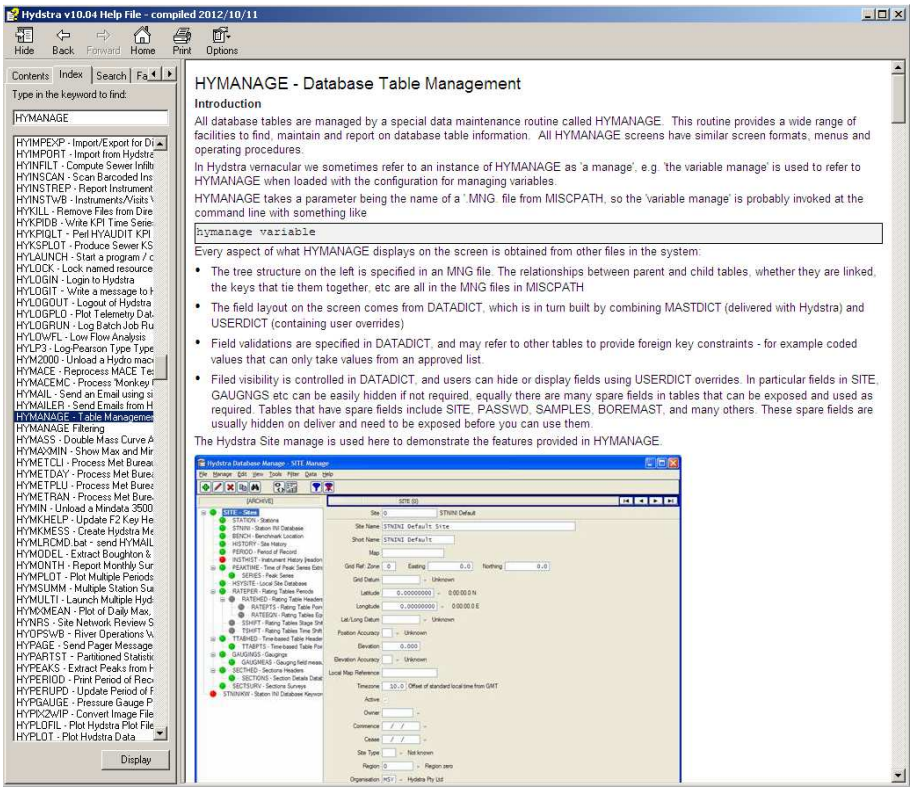
Also, using the <F1> key or the blue question mark key icon on the HYXPLORE menu bar while a menu item is highlighted, or using the Help function from within a program screen will take you to the help screen for that program or option.

The on-line help system will open with the relevant section opened for viewing:

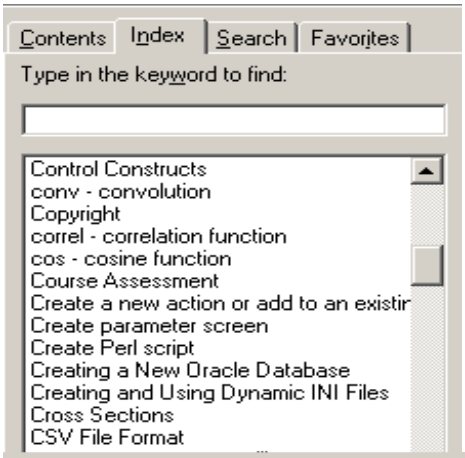


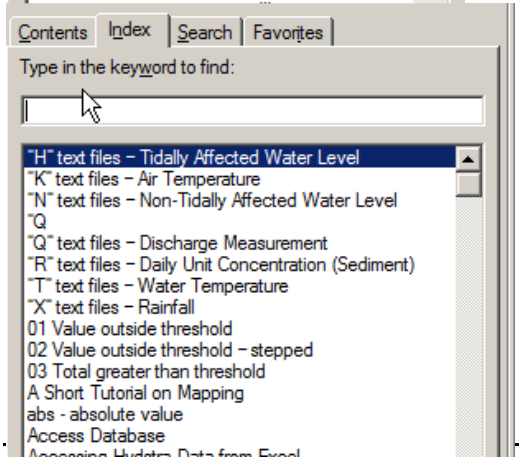
If not already at the desired location, clicking on the **Contents** tab will show the full list of chapter headings.

This list may be expanded by either double clicking a book icon or clicking on the '+' sign when a book icon has been selected. Clicking on any of the pages icons will display the information about the topic in the right-hand box.


Hydstra v10.04 Help File - compiled 2012/10/11
Hide
Back
Forward
Home
Print
Options
Contents
Index
Search
Type in the keyword to find:
HYMANAGE
Display
HYMANAGE - Database Table Management
Introduction
All database tables are managed by a special data maintenance routine called HYMANAGE. This routine provides a wide range of facilities to find, maintain and report on database table information. All HYMANAGE screens have similar screen formats, menus and operating procedures.
In Hydstra vernacular we sometimes refer to an instance of HYMANAGE as 'a manage', e.g. 'the variable manage' is used to refer to HYMANAGE when loaded with the configuration for managing variables.
HYMANAGE takes a parameter being the name of a '.MNG. file from MISCPATH, so the 'variable manage' is probably invoked at the command line with something like
hymanage variable
Every aspect of what HYMANAGE displays on the screen is obtained from other files in the system:
The tree structure on the left is specified in an MNG file. The relationships between parent and child tables, whether they are linked, the keys that tie them together, etc are all in the MNG files in MISCPATH
The field layout on the screen comes from DATADICT, which is in turn built by combining MASTDICT (delivered with Hydstra) and USERDICT (containing user overrides)
Field validations are specified in DATADICT, and may refer to other tables to provide foreign key constraints - for example coded values that can only take values from an approved list.
Filed visibility is controlled in DATADICT, and users can hide or display fields using USERDICT overrides. In particular fields in SITE, GAUGNGS etc can be easily hidden if not required, equally there are many spare fields in tables that can be exposed and used as required. Tables that have spare fields include SITE, PASSWD, SAMPLES, BOREMAST, and many others. These spare fields are usually hidden on deliver and need to be exposed before you can use them.
The Hydstra Site manage is used here to demonstrate the features provided in HYMANAGE.

7.2.1 Other Help Features - Index

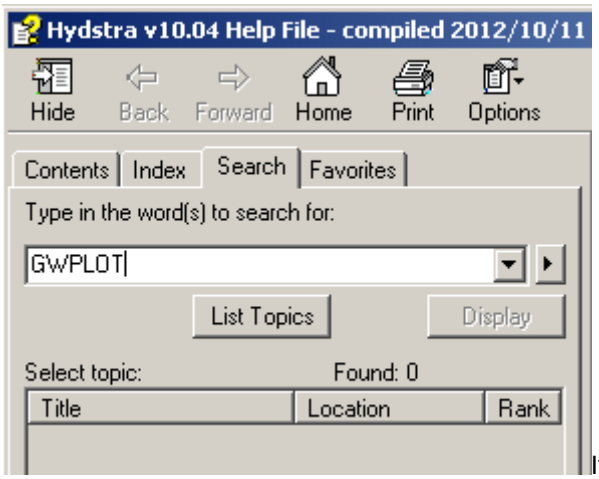



Contents
Index
Search
Favorites
Type in the keyword to find:
"H" text files – Tidally Affected Water Level
"K" text files – Air Temperature
"N" text files – Non-Tidally Affected Water Level
"Q
"Q" text files – Discharge Measurement
"R" text files – Daily Unit Concentration (Sediment)
"T" text files – Water Temperature
"X" text files – Rainfall
01 Value outside threshold
02 Value outside threshold – stepped
03 Total greater than threshold
A Short Tutorial on Mapping
abs - absolute value
Access Database

Selecting the Index Tab will show a list of all Key words that have been indexed in the help file.

Clicking on a topic in the Left hand pane will take you to that key word/phrase in the help file.

7.2.2 Other Help Features - Search

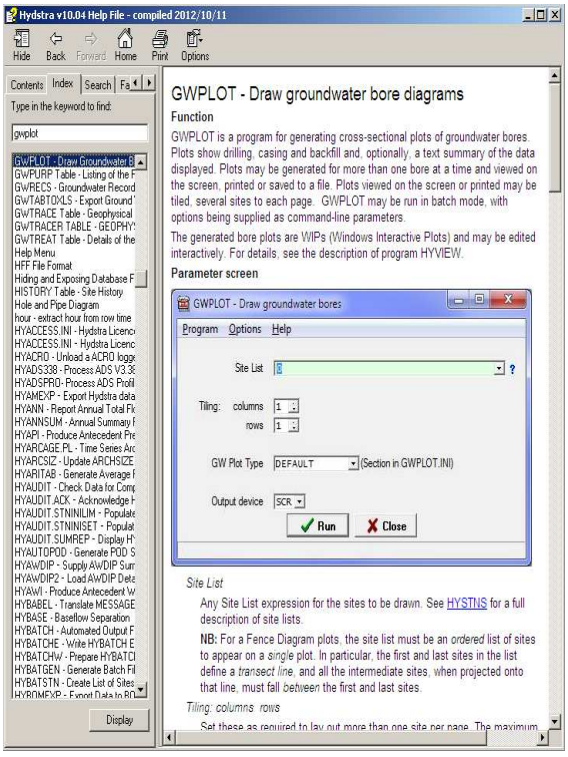


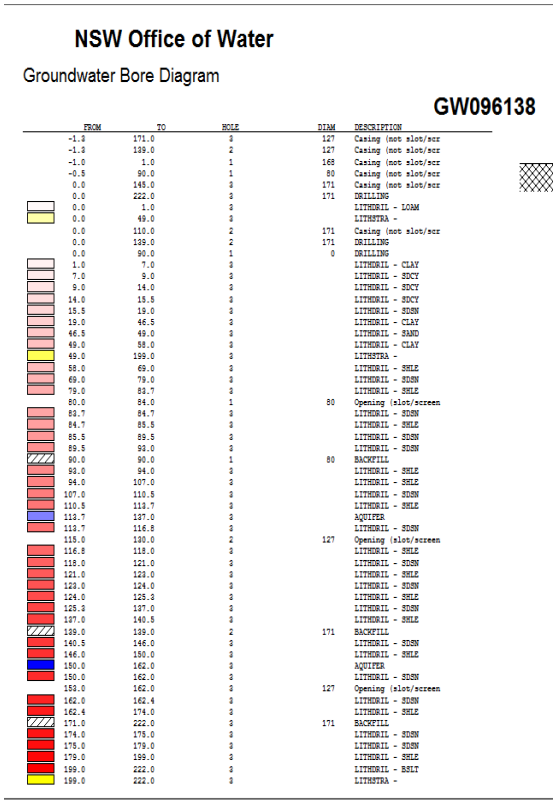
If you click on the Search tab, a window will appear in which you may enter the word(s) you are searching.

Clicking on the List Topics button will display the list of topics where that word(s) appear.

As well as typing in the words, the small right arrow next to the box lets you select a Boolean operator to interpose between words. Enter one or more words, with an operator if

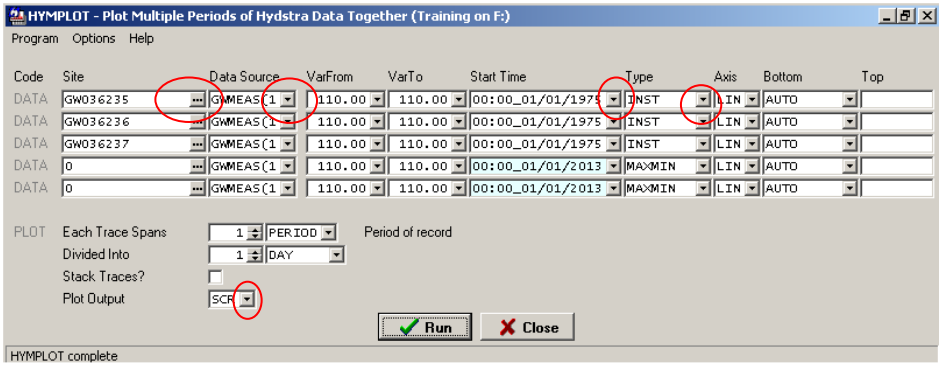
necessary, and you will be shown every document in which the combination appears. For example, type the words **flow NEAR duration**:


Hydstra v10.04 Help File - compiled 2012/10/11
Hide
Back
Forward
Home
Print
Options
Contents
Index
Search
Type in the keyword to find:
gwplot
GWPLOT - Draw groundwater bore diagrams
Function
GWPLOT is a program for generating cross-sectional plots of groundwater bores. Plots show drilling, casing and backfill and, optionally, a text summary of the data displayed. Plots may be generated for more than one bore at a time and viewed on the screen, printed or saved to a file. Plots viewed on the screen or printed may be tiled, several sites to each page. GWPLOT may be run in batch mode, with options being supplied as command-line parameters.
The generated bore plots are WIPs (Windows Interactive Plots) and may be edited interactively. For details, see the description of program HYVIEW.
Parameter screen
GWPLOT - Draw groundwater bores
Program
Options
Help
Site List
Tiling:
columns
rows
GW Plot Type
DEFAULT
(Section in GWPLOT.INI)
Output device
SCR
Run
Close
Site List
Any Site List expression for the sites to be drawn. See HYSTNS for a full description of site lists.
NB: For a Fence Diagram plots, the site list must be an ordered list of sites to appear on a single plot. In particular, the first and last sites in the list define a transect line, and all the intermediate sites, when projected onto that line, must fall between the first and last sites.
Tiling: columns rows
Display



Press <List Topics> to see the relevant documents, then select the desired entry. The document page is displayed with all its relevant information.

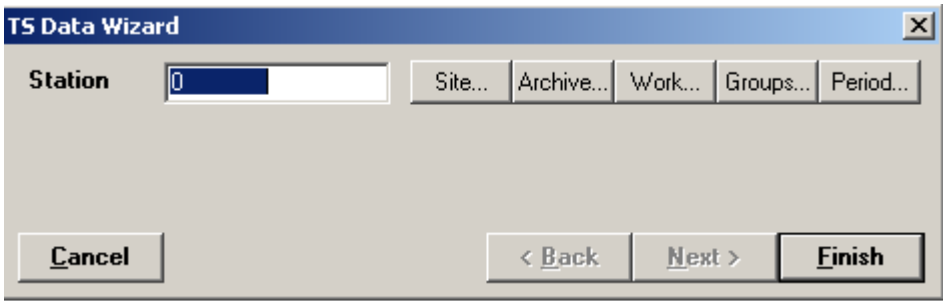
7.3 In Program Help


HYMPLOT - Plot Multiple Periods of Hydstra Data Together (Training on F:)
Program Options Help
Code Site Data Source VarFrom VarTo Start Time Type Axis Bottom Top
DATA GW036235 GWMEAS(1 110.00 110.00 00:00_01/01/1975 INST LIN AUTO
DATA GW036236 GWMEAS(1 110.00 110.00 00:00_01/01/1975 INST LIN AUTO
DATA GW036237 GWMEAS(1 110.00 110.00 00:00_01/01/1975 INST LIN AUTO
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
PLOT Each Trace Spans 1 PERIOD Period of record
Divided Into 1 DAY
Stack Traces?
Plot Output SCR
Run
Close
HYMPLOT complete

When a HYDSTRA program has been selected and loaded, HYDSTRA will provide extensive help facilities. This is available by pressing the Down arrow or ellipsis at the right hand side of each of the data entry boxes. This produces a series of dialog boxes that show available options.

Examples of these help options are shown below.

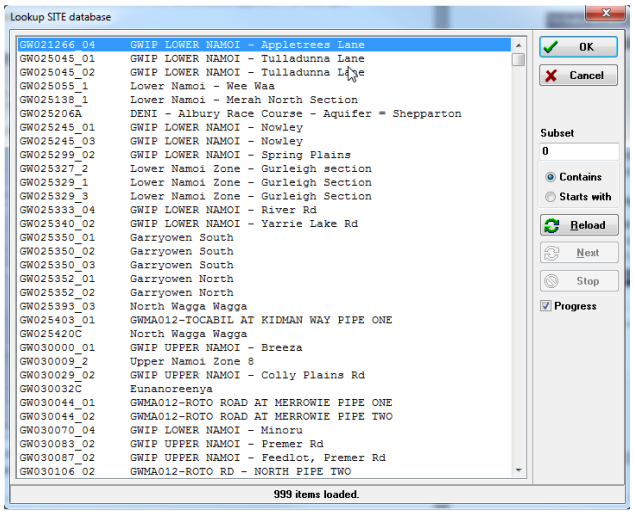
7.3.1 Data Wizard



The TS Data Wizard will load a screen that allows you to select a site from the SITE table, the time series archive or the PERIOD table. Work areas and groups are not active in Pinneena.

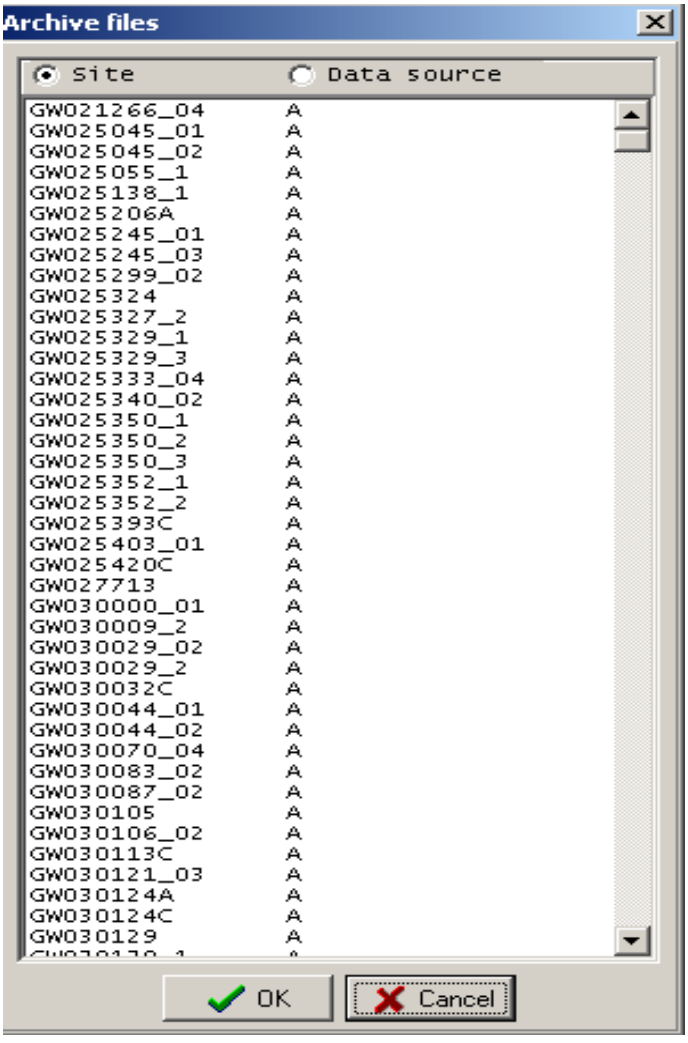
7.3.2 Selecting Site from the Site Table

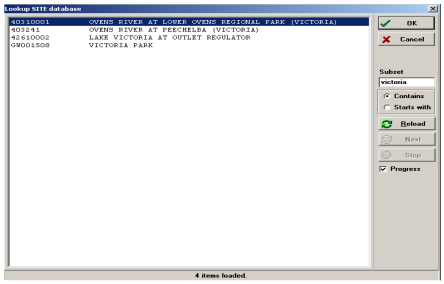
Clicking the **Site** button brings up a dialog box with all sites listed in numerical order. You can use the mouse and scroll bar or the <Page Up>, <Page Down> and arrow keys to move up and down this list to select a site.


Lookup SITE database
GW021266_04 GWIP LOWER NAMOI - Appletrees Lane
GW025045_01 GWIP LOWER NAMOI - Tulladunna Lane
GW025045_02 GWIP LOWER NAMOI - Tulladunna Lane
GW025055_1 Lower Namoi - Wee Waa
GW025138_1 Lower Namoi - Merah North Section
GW025206A DENI - Albury Race Course - Aquifer = Shepparton
GW025245_01 GWIP LOWER NAMOI - Nowley
GW025245_03 GWIP LOWER NAMOI - Nowley
GW025299_02 GWIP LOWER NAMOI - Spring Plains
GW025327_2 Lower Namoi Zone - Gurleigh section
GW025329_1 Lower Namoi Zone - Gurleigh Section
GW025329_3 Lower Namoi Zone - Gurleigh Section
GW025333_04 GWIP LOWER NAMOI - River Rd
GW025340_02 GWIP LOWER NAMOI - Yarrie Lake Rd
GW025350_01 Garryowen South
GW025350_02 Garryowen South
GW025350_03 Garryowen South
GW025352_01 Garryowen North
GW025352_02 Garryowen North
GW025393_03 North Wagga Wagga
GW025403_01 GWMA012-TOCABIL AT KIDMAN WAY PIPE ONE
GW025420C North Wagga Wagga
GW030000_01 GWIP UPPER NAMOI - Breeza
GW030009_2 Upper Namoi Zone 8
GW030029_02 GWIP UPPER NAMOI - Colly Plains Rd
GW030032C Eunanoreenya
GW030044_01 GWMA012-ROTO ROAD AT MERROWIE PIPE ONE
GW030044_02 GWMA012-ROTO ROAD AT MERROWIE PIPE TWO
GW030070_04 GWIP LOWER NAMOI - Minoru
GW030083_02 GWIP UPPER NAMOI - Premer Rd
GW030087_02 GWIP UPPER NAMOI - Feedlot, Premer Rd
GW030106_02 GWMA012-ROTO RD - NORTH PIPE TWO
OK
Cancel
Subset
0
Contains
Starts with
Reload
Next
Stop
Progress
999 items loaded.

To search for a site or stream enter part or all of the site name in the **Subset** box then click the left mouse button on the **Any text** button and click on the **Reload** button. In the following example we have entered "VICTORIA" as part of a site name

The program will then check the SITE database for occurrences of the word VICTORIA and list the site details as they are found. You can halt this listing, when the site you seek is listed, by clicking on the **Stop** button.

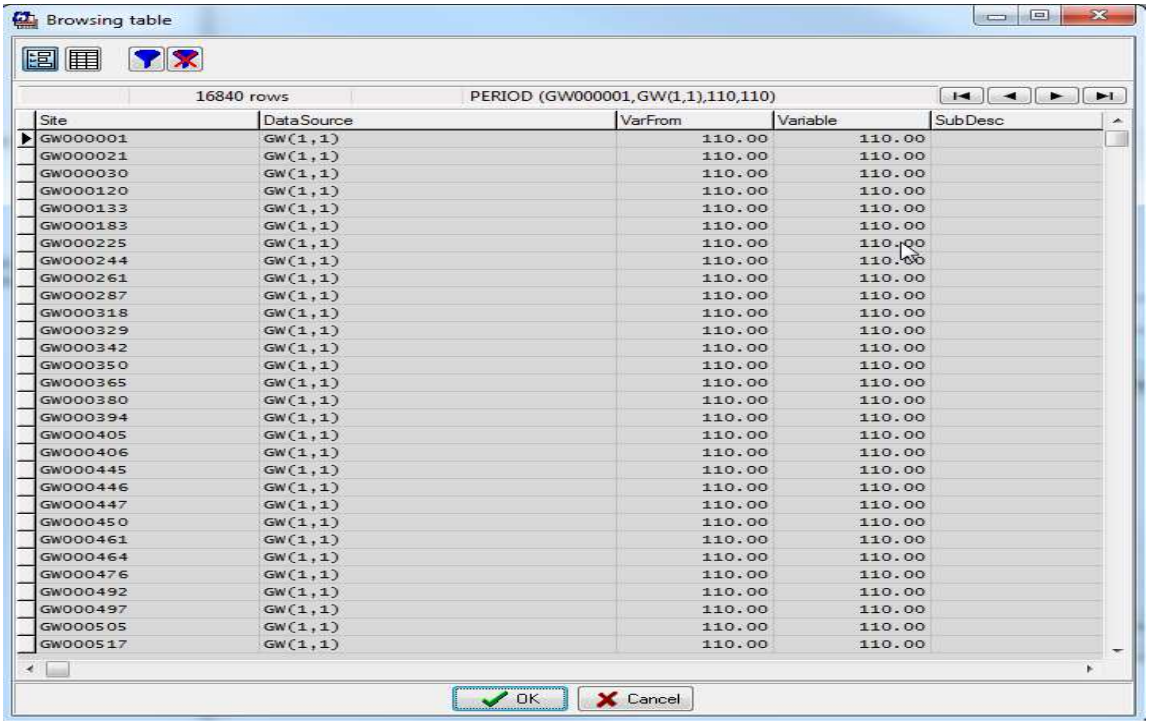




You can make your selection by moving the cursor to the required site and clicking on the **OK** button.

7.3.3 Selecting a Site from the Archive

The program provides a File List dialogue box in which you can scroll though a list of sites for which data is held in the archive. You may also enter the site identifier, ie the site number, in the **File Name** box. Note that entering the site name will not work. When selecting files, you must select the data file (eg GW025333_04.A) rather than the index file (GW025833_04.AX).



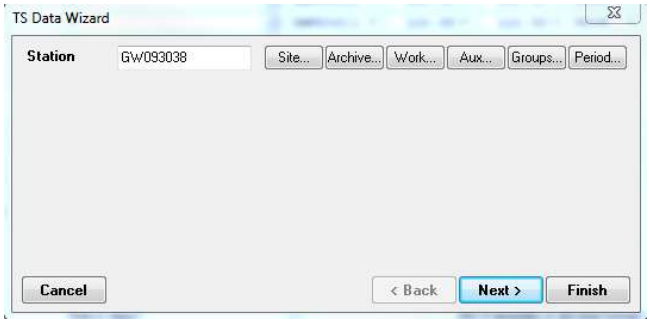
Site	DataSource	VarFrom	Variable	SubDesc
GW000001	GW(1,1)	110.00	110.00	
GW000021	GW(1,1)	110.00	110.00	
GW000030	GW(1,1)	110.00	110.00	
GW000120	GW(1,1)	110.00	110.00	
GW000133	GW(1,1)	110.00	110.00	
GW000183	GW(1,1)	110.00	110.00	
GW000225	GW(1,1)	110.00	110.00	
GW000244	GW(1,1)	110.00	110.00	
GW000261	GW(1,1)	110.00	110.00	
GW000287	GW(1,1)	110.00	110.00	
GW000318	GW(1,1)	110.00	110.00	
GW000329	GW(1,1)	110.00	110.00	
GW000342	GW(1,1)	110.00	110.00	
GW000350	GW(1,1)	110.00	110.00	
GW000365	GW(1,1)	110.00	110.00	
GW000380	GW(1,1)	110.00	110.00	
GW000394	GW(1,1)	110.00	110.00	
GW000405	GW(1,1)	110.00	110.00	
GW000406	GW(1,1)	110.00	110.00	
GW000445	GW(1,1)	110.00	110.00	
GW000446	GW(1,1)	110.00	110.00	
GW000447	GW(1,1)	110.00	110.00	
GW000450	GW(1,1)	110.00	110.00	
GW000461	GW(1,1)	110.00	110.00	
GW000464	GW(1,1)	110.00	110.00	
GW000476	GW(1,1)	110.00	110.00	
GW000492	GW(1,1)	110.00	110.00	
GW000497	GW(1,1)	110.00	110.00	
GW000505	GW(1,1)	110.00	110.00	
GW000517	GW(1,1)	110.00	110.00	

7.3.4 Selecting a Site from the Period Table

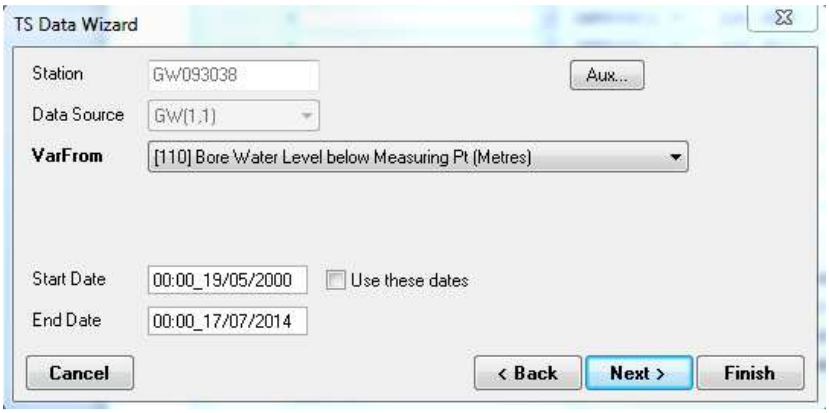
The program will provide a view of the Period table which shows what data has been collected at each site, from which you may select a site, variable and period to view.

7.4 Filling in the Other Data

At each step the Wizard gathers the data necessary to fill out the parameter screen of the calling program. At any time all this information can be transferred across to the program's parameter screen for you by clicking on the **Finish** button.



To gather this data after you have selected your site you click on the **Next** button. The program will respond with the suffixes for any data files for that site (in PINNEENA there will only be one suffix A) - click on the **Next** button to move on.

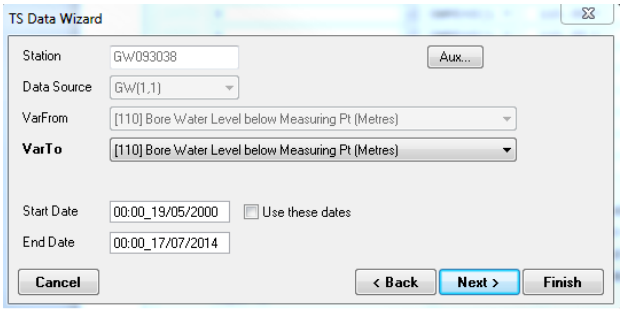


The Wizard will then check the data file and list all of the variables for which data is held.

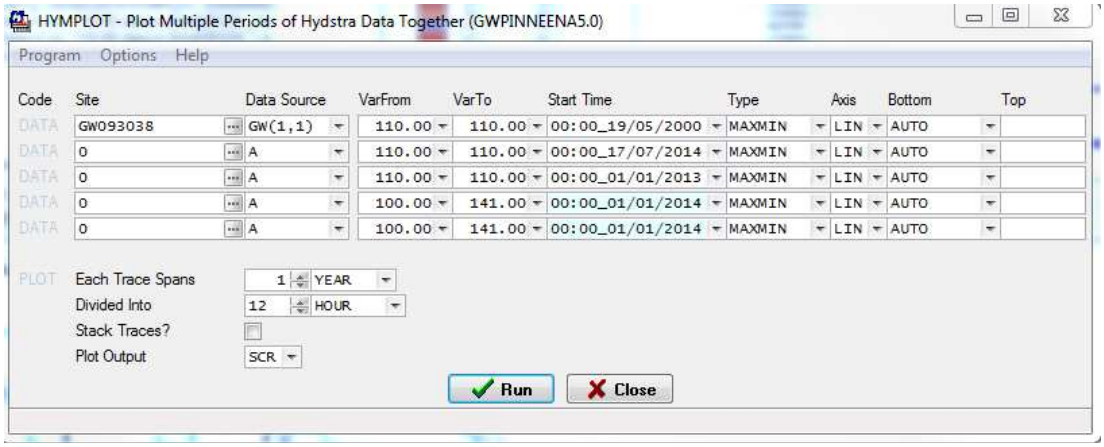
Select the required variable and click the **Next** button.

The program will then list (in a drop down list) all possible data conversions for the selected variable. The most common variable conversion is automatically selected for you but you can select any of the valid conversions from the list.

Clicking the **Next** button will select the most appropriate plot type to display your data or allow you to select the plot type you desire. The period of record for the selected data will also be displayed.



Clicking on the Finish button will return you to the calling program with the parameter screen completed.

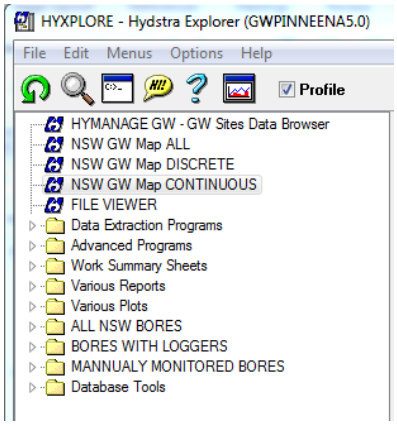


NOTE: There may still need to be some items to be filled in on the parameter screen related to how you want the data to be displayed.

For any field in a parameter screen that has a drop-down arrow next to it, you may select from a list of the allowable entries by clicking on the arrow.

8.0 ANALYSIS PROGRAMS

8.1 General



If, instead of selecting **Mapping**, you select the option you are presented with another range of menu options as shown above on PINNEENA 10.1. Under each of these menus is either a series of data analyses or database enquiry programs.

8.2 Data Extraction Programs

Many different reports (tabular) and Analyses (generally plot) programs are provided under the menu options. Some examples are Various Reports, Various Plots etc

All the HYDSTRA continuous data analyses programs under the menus have similar parameter screen formats. These parameter screens are displayed when a program is selected.

To see what each program can do for you, select the program name in the menu and hit<F1> or select the Help Icon or Help menu item.

This will open automatically on the related help details for that program. The help includes sample outputs as well as explanation of what the program does and how it works.

A typical HYDSTRA data analysis program parameter screen is displayed below.

There are some fields on this parameter screen that will be unfamiliar to those users who have not seen HYDSTRA before. Whilst all these fields may not be on all parameter screens, it does give an overview of those fields most commonly found in the HYDSTRA parameter screens.

* **Site**
    * this is the unique number which identifies the site, from which the data is required. The F2 lookup key or clicking with the mouse on the down arrow in the box will allow the user to find the site ID from a gauging site name using the Data Wizard.

* **Data Source**
  This is an identifier used to distinguish between different data sources within HYDSTRA on the DVD. The only Data Sources are:
  * archive data, for which you use the default - **A**
  * data from the Discrete Monitoring Bores use **GWMEAS (1,1) (2,2)** etc.
* **VarFrom** and **VarTo**
  * At a Bore site many types of data may be collected and stored, for example Water Depth, rainfall, EC, etc. As explained in the **Data** section, this data is differentiated by the variable number. For example:

    Water level depth in metres - variable number = 110

    rainfall in millimetres - variable number = 10

    Not only is the type of data differentiated but the units it is stored in are also differentiated by the variable number. For Example:

    stream height in decimal feet - variable number = 101

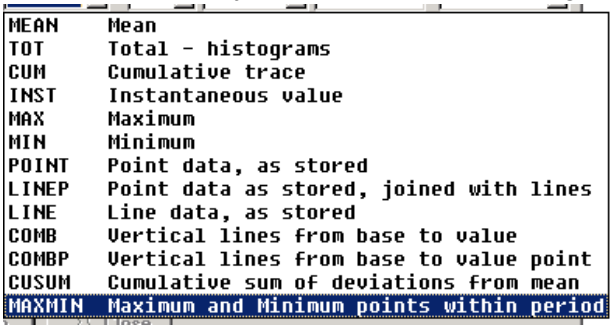
    rainfall in points - variable number = 9
  * this differentiation also allows for the conversion of data between these variables. For example:

    VarFrom = 110 VarTo = 110

    This says that no conversion is required, just use the stream height data in metres.

  commonly used variable numbers and conversion are outlined in the **Data** section.
* **Plot type**

Because of the large amount of data stored it is neither possible nor desirable to plot every data point on a typical trace. **Plot type** gives the user control over how the data is displayed. However, it does rely on the user understanding how the data is handled by


MEAN Mean
TOT Total - histograms
CUM Cumulative trace
INST Instantaneous value
MAX Maximum
MIN Minimum
POINT Point data, as stored
LINEP Point data as stored, joined with lines
LINE Line data, as stored
COMB Vertical lines from base to value
COMBP Vertical lines from base to value point
CUSUM Cumulative sum of deviations from mean
MAXMIN Maximum and Minimum points within period

HYDSTRA. A maximum of 35136 intervals may be plotted on a trace with a maximum of 2 points per interval.

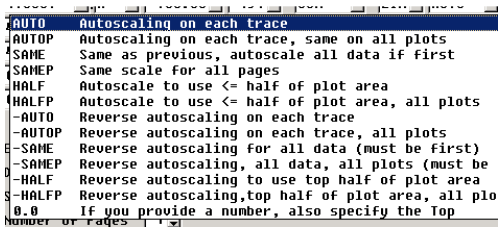
* For data that is stored or computed as continuous data (e.g. Water depth in metres) the following plotting options can be used:
  - MEAN - plots the mean value during the period as a histogram.
  - MIN - plots the minimum value during the period as a histogram
  - MAX - plots the maximum value during the period as a histogram
  - MAXMIN - plots two points in the period, the maximum and the minimum, at the time they occurred in the period.

- INST - plots the instantaneous value during the period at the time it occurred.

* For discrete data stored as points, e.g. gauging's or water quality sample data
  - POINT - plots discrete points
  - LINEP - produces straight lines between the point values plotted
  - COMB and COMBP produce lines between the baseline and the value.

*** Axis, Base, Scale, Period to be Plotted and Period Multiplier**

* these options allow the user to specify the axes of the plot.
* in AXIS there are two different axes types that can be specified
  - LIN - normal linear scale
  - LOG - log-log scale


AUTO Autoscaling on each trace
AUTOP Autoscaling on each trace, same on all plots
SAME Same as previous, autoscale all data if first
SAMEP Same scale for all pages
HALF Autoscale to use <= half of plot area
HALFP Autoscale to use <= half of plot area, all plots
-AUTO Reverse autoscaling on each trace
-AUTOP Reverse autoscaling on each trace, all plots
-SAME Reverse autoscaling for all data (must be first)
-SAMEP Reverse autoscaling, all data, all plots (must be
-HALF Reverse autoscaling to use top half of plot area
-HALFP Reverse autoscaling,top half of plot area, all plo
0.0 If you provide a number, also specify the Top

* and with BASE and SCALE the Y axis is defined.
* The default is AUTO in the **Bottom** field. This automatically selects the best scale to display each separate trace on the plot (ie there may be different scales for different traces on the same plot). "-AUTO" causes automatic scaling with the trace inverted (lowest value at the top, highest at the bottom). This is useful when plotting rainfall and flow on the same set of axes.
  - To define a scale of your choice it is necessary to set values in both **Bottom**, the minimum value to be displayed on the Y axes and **SCALE**, the maximum value to be displayed, eg 0 in **Bottom** and 10,000 in **Top**.
  - There is also a **Same** option in the Base field. This can be used anytime a scale has been defined by **AUTO** or by setting the minimum and maximum values. All traces with **Same** will use the defined scale.
* The **Each Page Spans** field has 7 options; Year, Month, Day, Hour, Minute, Second and Period (of record), while the **Timestep Multiplier** is a number field. Together they define the extent of the time or 'X' axis. For example:
  - To plot 10 years of data

    Timestep to be Plotted = Year

    Timestep Multiplier = 10
  - To plot 8 hours of data

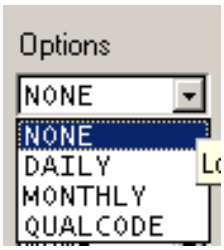
    Timestep to be Plotted = Hours

    Timestep Multiplier = 8

*** Option**

- The Options parameter lets you specify a set of advanced options for each trace.

  There are two main features that can be controlled by the Options:

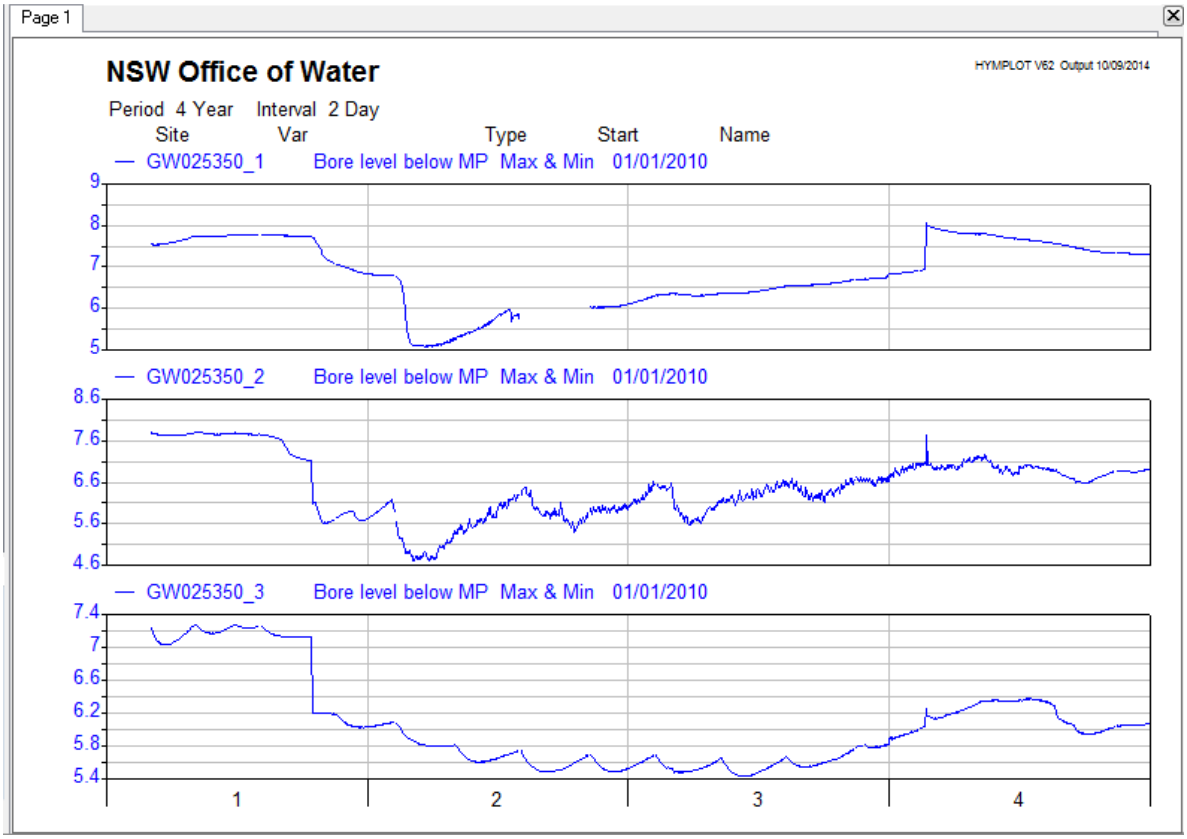


You can override the default interval (timestep) used by this trace, allowing you to plot daily or monthly rainfall totals against instantaneous flows

You can force a trace to be coloured according to the quality code of the data in it. This can cause a single trace to be made up of several coloured segments, each representing a run of data with a certain range of quality codes. If you choose an option with this setting, you must either have one trace only, or have your *Stack Traces* parameter set to Yes.

If this parameter is left blank or has a value of NONE, no options are applied.

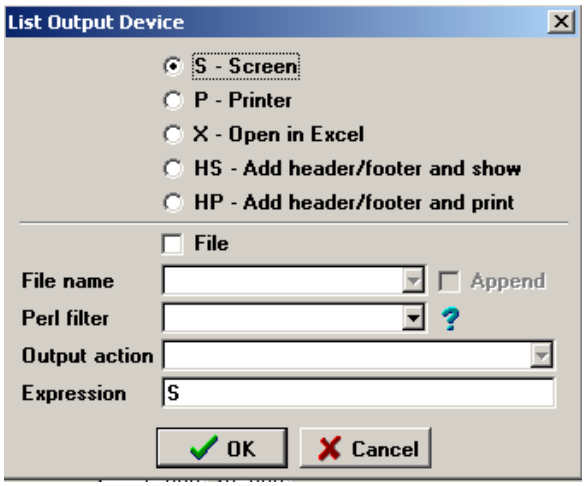
* **Interval Resolution and Interval Multiplier (Divided into)**
    * these two options define the number of points that are plotted. As mentioned previously there are limits to the number of intervals that can be plotted (max 35,136). If you specify a value other than **DEFAULT**, the total number of intervals on a trace (Period Multiplier * Period Type) / (Interval Multiplier * Interval Type) may not exceed 35136. You will be informed by the system if this number of points is exceeded.
    * The default option is **DEFAULT** and **1**. With this option the system works out the best interval resolution option to display as much data as possible.
    * To manually select a desired period the system works similarly to **Each Page Spans** and **Period Multiplier** above, ie
        - To plot a point every 10 days
            Interval Resolution = Days
            Interval Multiplier = 10
* **Start Time**
    * Once the axes have been defined the start time of the plot is entered.
    * Plots must start on the beginning of a page span unit, eg if the plot spans 6 months the plot must start at 00:00 on the 1st day of a month,.
* **Number of pages**
    - Specifies the number of pages the plot is to span.
* **Stacked Traces**
    * **NO**, the default, allows the user to have several traces on the one set of axes on the page,
    * **YES** allows several sets of axes, one below the next, on the one page, with one trace per set of axes as seen below.


Page 1
NSW Office of Water
HYMPLOT V62 Output 10/09/2014
Period 4 Year Interval 2 Day
Site Var Type Start Name
GW025350_1 Bore level below MP Max & Min 01/01/2010
GW025350_2 Bore level below MP Max & Min 01/01/2010
GW025350_3 Bore level below MP Max & Min 01/01/2010
1
2
3
4

* **Plot Output**
    * This allows the user to specify the output device to which the output should be sent. The default is to the screen. This allows the user to view the data before sending it to the preferred output device.
    * The output device may be a file (six formats available) or to the standard windows printer.

SCR	SCR	Screen Display
WPR	WPR	Standard Windows Printer
BMP	BMP	Windows Bit Map
JP1	JP1	JPEG File
JP2	JP2	JPEG File
JPG	JPG	JPEG File
PN1	PN1	PNG File
PN2	PN2	PNG File
PNG	PNG	PNG File
SVG	SVG	SVG File
WIP	WIP	Windows Interactive Plot File
WIT	WIT	WIP File (Text Format)
WMF	WMF	Windows MetaFile

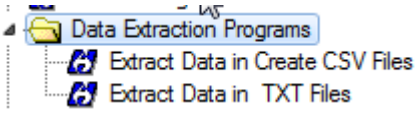
- If the output standard format is a report (ie text) or there is a plot or print option in the program than there are additional options for output.



X will load the text output into MS Excel. Note: Unless the output is from HYCSV the data will not be automatically formatted into columns
HS and HP will load the text output into MS Word.

8.3 Extraction Programs

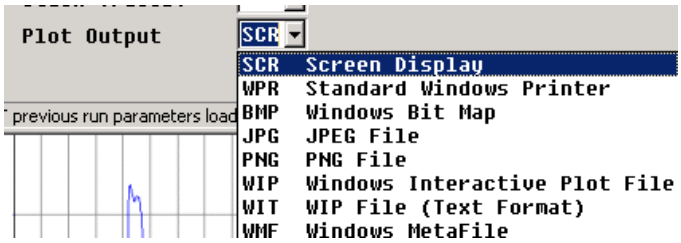
Included in the Extraction menu is a section called Extraction Programs.



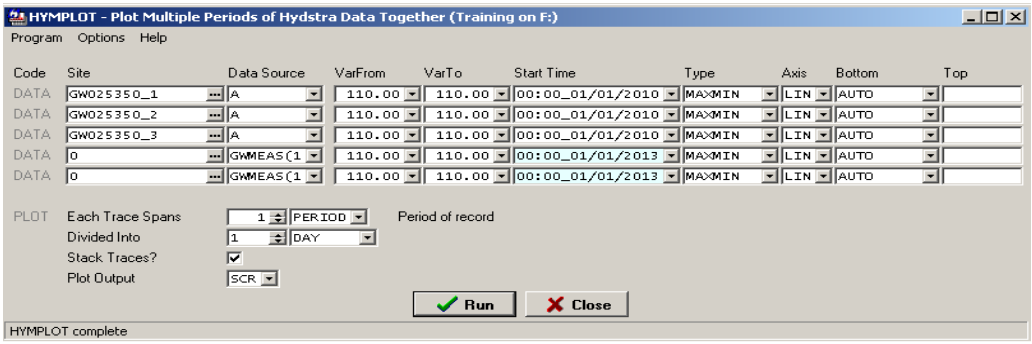
This menu contain direct access to the most commonly used programs in PINNEENA and saves having to hunt through the other menus to find the programs you commonly may wish to use.

8.4 Viewing Outputs

The generated output is displayed in a special viewing window, either as a separate window or as the right hand window in PINNEENA Explore. This special window is automatically run when you select a plot device of **SCR** (screen) when running a HYDSTRA plot program, or **S**(creen) as the output device when running HYDSTRA programs that produce text outputs.



From this window you can format plot and text report files on the screen, and then copy them to the clipboard or send them to your Windows printer.


HYMPLOT - Plot Multiple Periods of Hydstra Data Together (Training on F:)
Program Options Help
Code Site Data Source VarFrom VarTo Start Time Type Axis Bottom Top
DATA GW025350_1 A 110.00 110.00 00:00_01/01/2010 MAXMIN LIN AUTO
DATA GW025350_2 A 110.00 110.00 00:00_01/01/2010 MAXMIN LIN AUTO
DATA GW025350_3 A 110.00 110.00 00:00_01/01/2010 MAXMIN LIN AUTO
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
PLOT Each Trace Spans 1 PERIOD Period of record
Divided Into 1 DAY
Stack Traces?
Plot Output SCR
Run
Close
HYMPLOT complete

The plot shown above has three traces on stacked axes. The top trace shows the maximum or minimum instantaneous flow within a 12 hour period, the middle trace shows 12 hour histograms of flow volume and the bottom trace shows the daily flow volume.

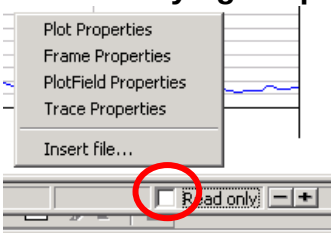
Note: This plot illustrates one of the 'traps for young players' in viewing graphical data.

There are less issues in viewing tabular data be it from the data extraction programs or from the programs that produce formatted text outputs. Only the period you have specified is displayed.

Site GW025350_2 Year 2011
Variable 110.00 Bore Water Level below Measuring Pt in Metres Table Type Level
Figures are for period ending 24:00

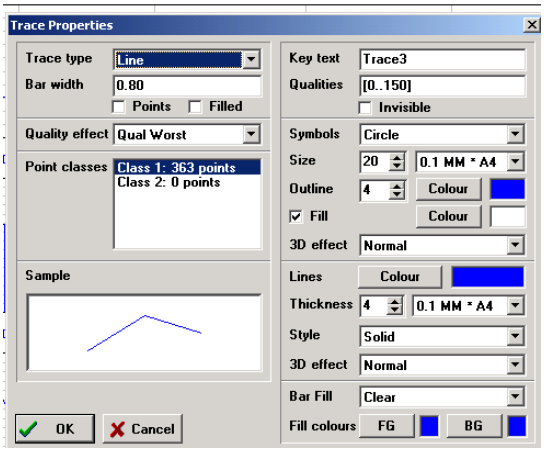
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day
1	5.719A	6.137A	4.895A	4.772A	5.348A	5.532A	5.842A	6.321A	5.829A	5.871A	5.711A	5.890A	1
2	5.730A	6.148A	4.835A	4.788A	5.389A	5.554A	5.921A	6.336A	5.795A	5.757A	5.773A	5.887A	2
3	5.742A	6.158A	4.844A	4.773A	5.404A	5.626A	6.000A	[ ]]	5.792A	5.691A	5.784A	5.914A	3
4	5.755A	6.166A	4.819A	4.769A	5.397A	5.657A	6.059A	6.329A	5.809A	5.668A	5.767A	5.931A	4
5	5.768A	6.168A	4.760A	4.763A	5.374A	5.660A	6.082A	6.352A	5.815A	5.683A	5.802A	5.895A	5
6	5.781A	6.106A	4.719A	4.777A	5.388A	5.665A	6.100A	6.390A	5.860A	5.692A	5.853A	5.915A	6
7	5.796A	6.008A	4.745A	4.789A	5.448A	5.675A	6.058A	6.419A	5.818A	5.684A	5.858A	5.948A	7
8	5.809A	5.899A	4.796A	4.819A	5.489A	5.683A	5.984A	6.452A	5.824A	5.664A	5.886A	5.960A	8
9	5.824A	[ ]]	4.811A	4.905A	5.481A	5.698A	6.025A	6.462A	5.881A	5.655A	[ ]]	5.962A	9
10	5.837A	5.674A	4.822A	5.009A	5.486A	5.672A	6.088A	6.466A	5.860A	5.625A	5.895A	5.990A	10
11	5.850A	5.586A	4.804A	5.033A	5.543A	5.628A	6.047A	6.424A	5.846A	5.584A	5.837A	6.028A	11
12	5.865A	5.439A	4.775A	5.041A	5.522A	5.637A	6.036A	6.339A	5.763A	5.538A	5.880A	6.007A	12
13	5.875A	5.359A	4.768A	5.035A	5.530A	5.666A	6.079A	6.299A	5.750A	5.522A	5.926A	5.980A	13
14	5.883A	5.295A	4.761A	5.049A	5.462A	5.689A	6.025A	6.276A	5.792A	5.565A	5.977A	5.926A	14
15	5.900A	5.259A	4.771A	5.042A	5.383A	5.689A	5.985A	6.276A	5.792A	5.607A	5.923A	5.912A	15
16	5.914A	5.258A	4.790A	5.026A	5.378A	5.752A	6.047A	6.312A	5.836A	5.519A	5.911A	5.897A	16
17	5.927A	5.254A	4.784A	5.017A	5.395A	5.845A	6.116A	6.375A	5.859A	5.424A	5.915A	5.900A	17
18	5.942A	5.249A	4.810A	5.059A	5.399A	5.827A	6.164A	6.346A	5.856A	5.427A	5.940A	5.950A	18
19	5.954A	5.245A	4.821A	5.090A	5.413A	5.825A	6.176A	6.194A	5.890A	5.462A	5.972A	6.000A	19
20	5.970A	5.192A	4.840A	5.127A	5.446A	5.868A	6.176A	6.070A	5.902A	5.505A	5.961A	5.964A	20
21	5.985A	5.070A	4.889A	5.180A	5.488A	5.953A	6.179A	5.995A	5.806A	5.523A	5.940A	5.944A	21
22	6.000A	4.962A	4.917A	5.197A	5.571A	5.887A	6.181A	5.949A	5.820A	5.543A	5.975A	5.942A	22
23	6.015A	4.908A	4.877A	5.155A	5.677A	5.833A	6.191A	5.947A	5.850A	5.597A	5.932A	5.966A	23
24	6.029A	4.911A	4.883A	5.151A	5.640A	5.778A	6.231A	5.970A	5.849A	5.684A	5.886A	5.982A	24
25	6.041A	4.920A	4.821A	5.156A	5.574A	5.777A	6.266A	5.985A	5.835A	5.671A	5.927A	6.012A	25
26	6.056A	4.921A	4.751A	5.153A	5.549A	5.808A	6.231A	5.958A	5.833A	5.615A	6.026A	6.051A	26
27	6.070A	4.910A	4.715A	5.163A	5.538A	5.801A	6.185A	5.947A	5.883A	5.622A	5.989A	6.024A	27
28	6.085A	4.926A	4.710A	5.206A	5.516A	5.775A	6.195A	5.937A	5.962A	5.690A	5.942A	6.007A	28
29	6.100A		4.746A	5.244A	5.521A	5.767A	6.230A	5.927A	6.013A	5.724A	5.980A	5.994A	29
30	6.112A		4.791A	5.292A	5.536A	5.783A	6.281A	5.873A	5.896A	5.694A	5.975A	5.967A	30
31	6.124A		4.763A		5.552A		6.307A	5.847A		5.666A		5.970A	31
Mean	5.918A	5.449A	4.801A	5.019A	5.479A	5.734A	6.113A	6.192A	5.845A	5.619A	5.901A	5.959A	
Median	5.914A	5.259A	4.796A	5.042A	5.486A	5.725A	6.100A	6.288A	5.835A	5.625A	5.923A	5.962A	
ly Mean	6.124A	6.168A	4.917A	5.292A	5.677A	5.953A	6.307A	6.466A	6.013A	5.871A	6.026A	6.051A	
ly Mean	5.719A	4.908A	4.710A	4.763A	5.348A	5.532A	5.842A	5.847A	5.750A	5.424A	5.711A	5.887A	
nst.Max	6.130A	6.170A	4.958A	5.321A	5.703A	5.995A	6.320A	6.478A	6.101A	5.918A	6.050A	6.078A	
nst.Min	5.712A	4.882A	4.690A	4.745A	5.318A	5.519A	5.812A	5.837A	5.732A	5.400A	5.679A	5.865A	
ng Days	0	1	0	0	0	0	0	1	0	0	1	0	

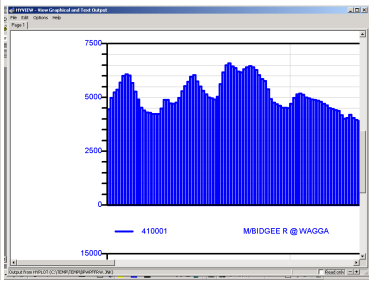
8.4.1 Modifying Outputs



There are a range of things that can be done to modify the outputs produced. Clearing the **Read Only** box and right clicking on a graph *will produce the menu on the left and give you the option to change a* range of graph properties. You may also right click on text for further options.

Holding down the left mouse button and swiping a box over selected trace, then selecting the Trace Properties option allows you to modify the trace and text attributes on the diagram.





8.4.2 Zoom Facility

There are also zoom buttons in the lower right hand corner which will allow you to zoom in and out of a graphics window or change the Font size in a text window.

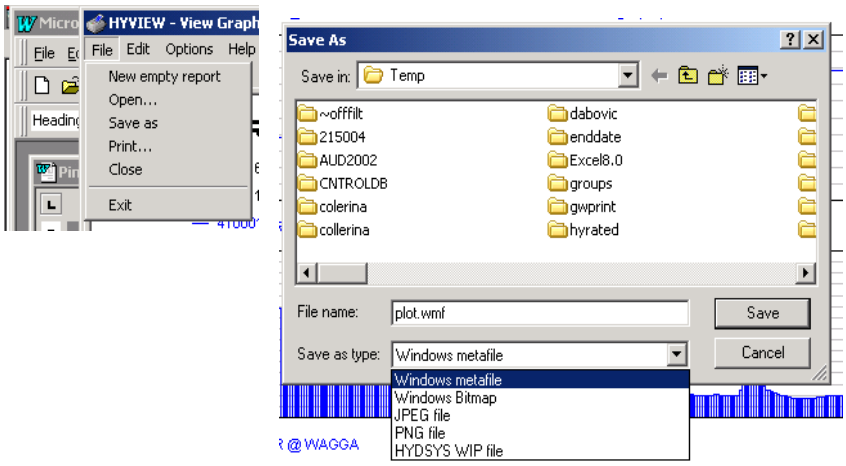
This zoom effect only changes the image on the screen.

If you save, print, copy, etc these actions are performed on the total image and not just the zoomed portion in the window.

8.4.3 Useful Menu Options

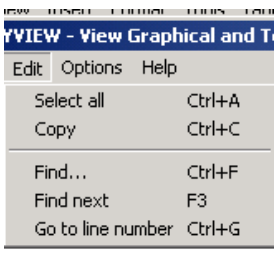
File

File | Save As - Saves the current report (to a text file) or the current plot file to a range of file formats as shown below:



File | Print - Prints the current page to the default windows print device which can be a printer, plotter, fax, etc.

8.4.4 Edit

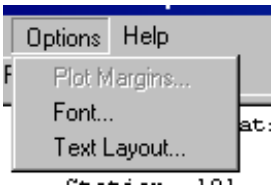


Undo, Cut, Select All, Paste, Find, Find Next and **Go** to all only work with Text files. Their operation is the same as standard windows operations ie Cut - Cuts the currently selected text into the clipboard.

Edit | Copy - For plots, this copies the current plot to the clipboard, so that you can paste it into Microsoft Word, or any other program that accepts pasting Windows Metafile data.

For text reports, it copies the currently selected (highlighted) data into the Windows clipboard as plain text.

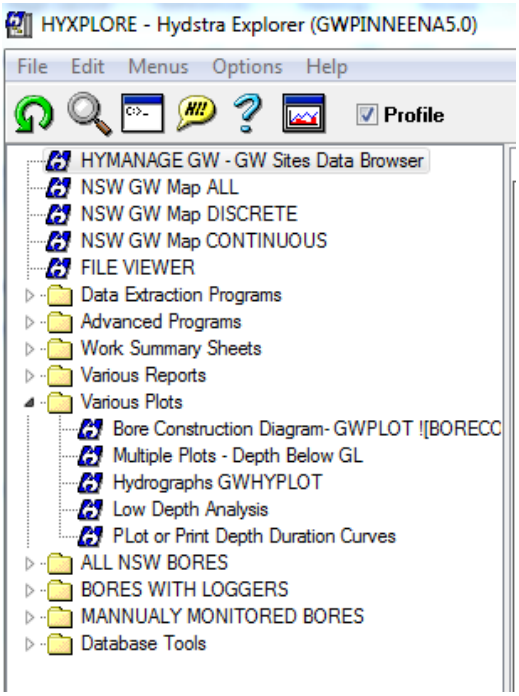
8.4.5 Options



Options items lets you specify the layout (Plot Margins and Text Layout) of the plot or text on the page to be printed. Font… allows the text reports fonts to be specified.

9.0 DATABASE PROGRAMS

9.1 General



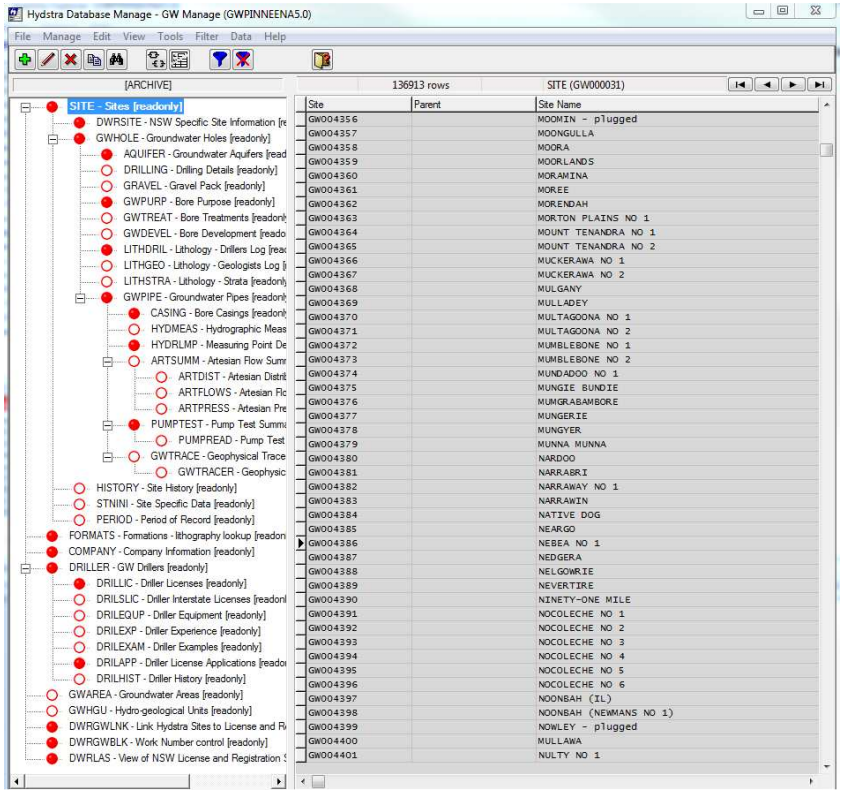
The other type of data that will be encountered is the database enquiry screen. Like the data analysis programs a consistent screen format, similar to that shown below, is used.

Data in HYDSTRA is stored in two ways. Time series data (a series of times and data values) is stored in a compressed and encoded format, and can only be accessed by HYDSTRA programs. Most other ancillary information – information about the site, ratings, cross sections etc. - is stored in a series of tables in the \HYD\DAT\DBF directory.

Many of the databases within HYDSTRA consist of several data tables with a parent-child relationship. That is, the key field(s) of one (parent) table is part of a multiple key in the child table. A system of parent – child tables is referred to as a system or manage. It is possible for some tables to be in more than one system. You may see an example of this by doing the following:-

Select **HYMANAGE GW** – GW Sites Data Browser.

This will show the first entry in the SITE table


Hydstra Database Manage - GW Manage (GWPINNEENA5.0)
File Manage Edit View Tools Filter Data Help
[ARCHIVE]
136913 rows
SITE (GW000031)
SITE - Sites [readonly]
DWRSITE - NSW Specific Site Information [re
GWHOLE - Groundwater Holes [readonly]
AQUIFER - Groundwater Aquifers [read
DRILLING - Drilling Details [readonly]
GRAVEL - Gravel Pack [readonly]
GWPURP - Bore Purpose [readonly]
GWTREAT - Bore Treatments [readonly
GWDEVEL - Bore Development [readon
LITHDRIL - Lithology - Drillers Log [rea
LITHGEO - Lithology - Geologists Log [
LITHSTRA - Lithology - Strata [readonly
GWPIPE - Groundwater Pipes [readonly
CASING - Bore Casings [readonly
HYDMEAS - Hydrographic Meas
HYDRLMP - Measuring Point De
ARTSUMM - Artesian Flow Sum
ARTDIST - Artesian Distri
ARTFLOWS - Artesian Flo
ARTPRESS - Artesian Pre
PUMPTEST - Pump Test Summa
PUMPREAD - Pump Test
GWTRACE - Geophysical Trace
GWTRACER - Geophysic
HISTORY - Site History [readonly]
STNINI - Site Specific Data [readonly]
PERIOD - Period of Record [readonly]
FORMATS - Formations - lithography lookup [readon
COMPANY - Company Information [readonly]
DRILLER - GW Drillers [readonly]
DRILLIC - Driller Licenses [readonly]
DRILSLIC - Driller Interstate Licenses [readonl
DRILEQUP - Driller Equipment [readonly]
DRILEXP - Driller Experience [readonly]
DRILEXAM - Driller Examples [readonly]
DRILAPP - Driller License Applications [readon
DRILHIST - Driller History [readonly]
GWAREA - Groundwater Areas [readonly]
GWHGU - Hydro-geological Units [readonly]
DWRGWLNK - Link Hydstra Sites to License and Fe
DWRGWBLK - Work Number control [readonly]
DWRLAS - View of NSW License and Registration S
Site
Parent
Site Name
GW004356 MOOMIN - plugged
GW004357 MOONGULLA
GW004358 MOORA
GW004359 MOORLANDS
GW004360 MORAMINA
GW004361 MOREE
GW004362 MORENDAH
GW004363 MORTON PLAINS NO 1
GW004364 MOUNT TENANDRA NO 1
GW004365 MOUNT TENANDRA NO 2
GW004366 MUCKERAWA NO 1
GW004367 MUCKERAWA NO 2
GW004368 MULGANY
GW004369 MULLADEY
GW004370 MULTAGOONA NO 1
GW004371 MULTAGOONA NO 2
GW004372 MUMBLEBONE NO 1
GW004373 MUMBLEBONE NO 2
GW004374 MUNDADOO NO 1
GW004375 MUNGIE BUNDIE
GW004376 MUMGRABAMBORE
GW004377 MUNGERIE
GW004378 MUNGYER
GW004379 MUNNA MUNNA
GW004380 NARDOO
GW004381 NARRABRI
GW004382 NARRAWAY NO 1
GW004383 NARRAWIN
GW004384 NATIVE DOG
GW004385 NEARGO
GW004386 NEBEA NO 1
GW004387 NEDGERA
GW004388 NELGOWRIE
GW004389 NEVERTIRE
GW004390 NINETY-ONE MILE
GW004391 NOCOLECHE NO 1
GW004392 NOCOLECHE NO 2
GW004393 NOCOLECHE NO 3
GW004394 NOCOLECHE NO 4
GW004395 NOCOLECHE NO 5
GW004396 NOCOLECHE NO 6
GW004397 NOONBAH (IL)
GW004398 NOONBAH (NEWMANS NO 1)
GW004399 NOWLEY - plugged
GW004400 MULLAWA
GW004401 NULTY NO 1

The relationships of the SITE related tables are shown on the left side of the screen, as below.

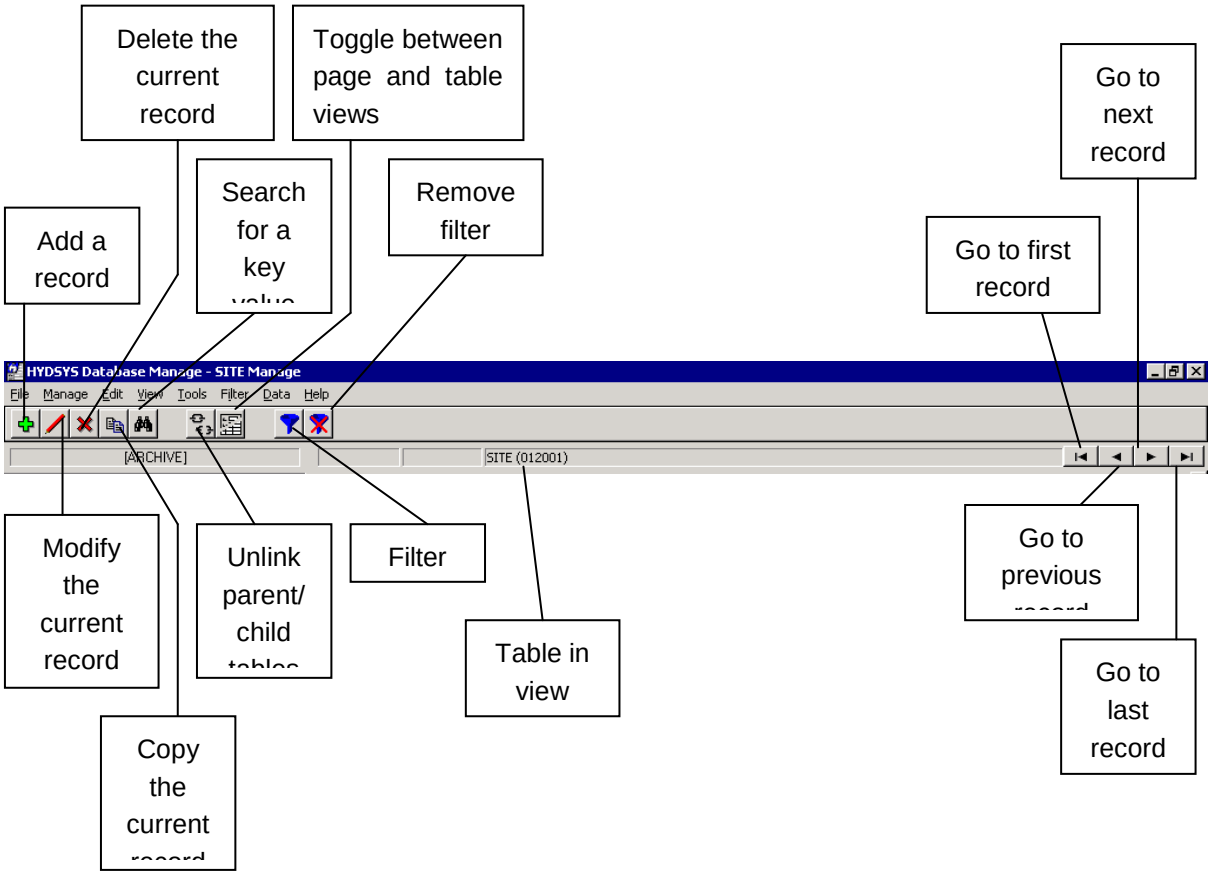
The red dots indicate that the database manage program is reading the databases are read only. This is a necessary result of working from a database on the DVD

This means that you will not be able to change any database data but you can still have full access to read and copy the data.

This structure tells us that the parent table is SITE.

SITE, DWRSITE,GWHOLE, STNINI, are child tables of SITE.

Across the top of the screen is a menu bar and toolbar which allow various operations on the table.



When you select any of the following from the HYDSTRA main menu you will be taken to the first.record in the parent table of the system you have selected.

A number of Ctrl-key commands are provided to allow manipulation and extraction of information from tables. These are also available on the drop-down menus at the top of the screen. Some tables have drop down menu entries specific to them, particularly under the Options heading.

Some of these operations, for example searching and filtering, allow you to make selections within them. To use these shortcuts, hold down the **Ctrl** key and press the appropriate letter.

The shortcuts and their meanings are as follows:-

<b> Toggle between **browse** (spreadsheet style view of all records) and screen form mode (full field view for a single site).

<f> **Find** the record that has the key field(s) that you enter. If you are in a child table, the parent keys will be defaults, and only the keys specific to the child table need to be entered.

<g> **Extract** statistics of numerical fields in the table. For example, in the SITE table, you could extract a sum, average, maximum, minimum and count of the values in say, the Elevation field.

<i> Create a **filter** that will only show some of the entries in the table. The filter may be based on the contents of one of the fields in the table, or it may be a HYSTNS

expression. Moving through the selection groups will create a Dbase expression, which may be modified before applying the filter. Once a filter is set, any operation that you perform on **all records**, for example, deletion, will only operate on those records that have been passed by the filter.

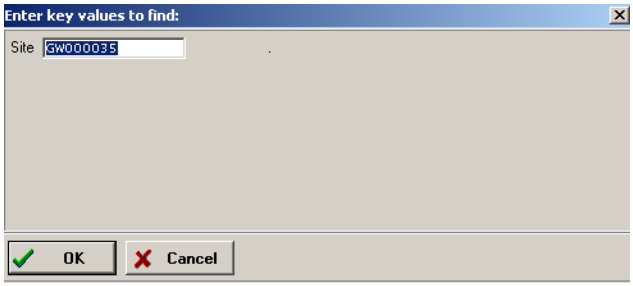
<l> Toggles between **link and unlink**, when in a child table. Normally, when you are in a child table, you will only see the records that have the same key field values as the parent that you entered through. By unlinking, you will be able to see other entries in the table. Re-linking may not always return you to the original parent.

<p> **Print** the information on the screen. HYDSTRA supports an expanded printing function that allows the production of specialised reports applicable to each table or system. It also allows you to tailor your own reports using the **List selected fields** option.

Tables in the SITE system are accessed by first finding the site of interest. Do this by entering the site system, and clicking the search button

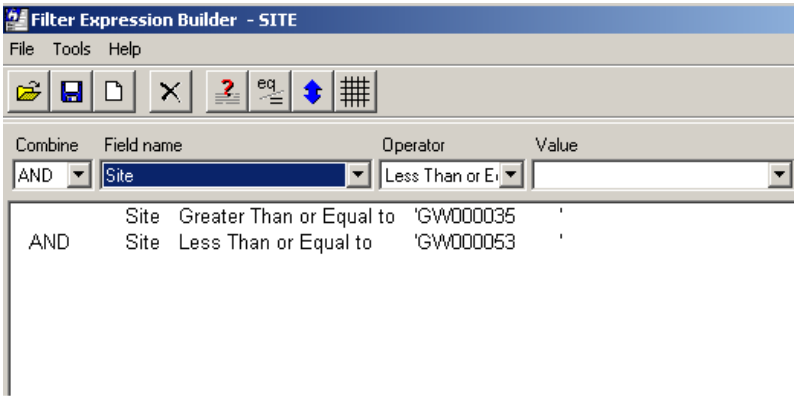
or **<Ctrl> <f>.** Enter the site identifier in the search box and clock **OK**.

The following dialog box appears and you are requested to enter the site number of interest or one close to it.



You may also find sites of interest by filtering.

To do this, click on the **Filter** button or press **<Ctrl> <i>** to bring up the filter window.

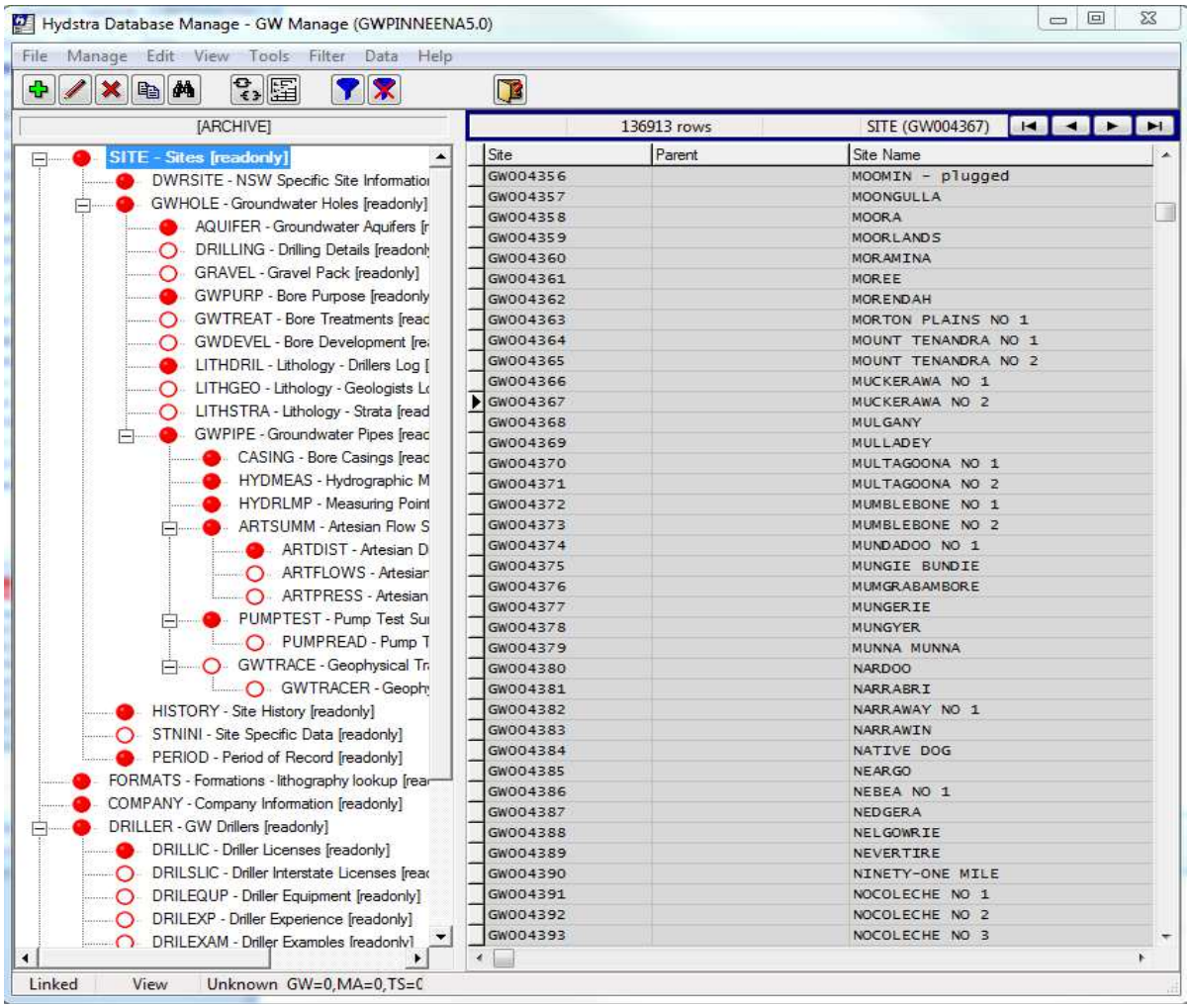


From here you may enter multiple filter parameters. Usually, the easiest way to use the filter builder is by selecting fields and operators from the drop-down boxes, and entering a value in the **Value** window. For complex filter expressions, though, it is sometimes necessary to toggle the view to dBase expression format. This allows you to add brackets to the filter expression. You may change the .AND. operator to .OR. by selecting the line and right clicking.

This will display the first site selected. You may scroll through the selected sites one record at a time using the arrows in the top right hand corner, or you may toggle to a table view and click on the site you want.

You can toggle between Form and Browse views at any time using the toggle button.

Form View – all fields for one site

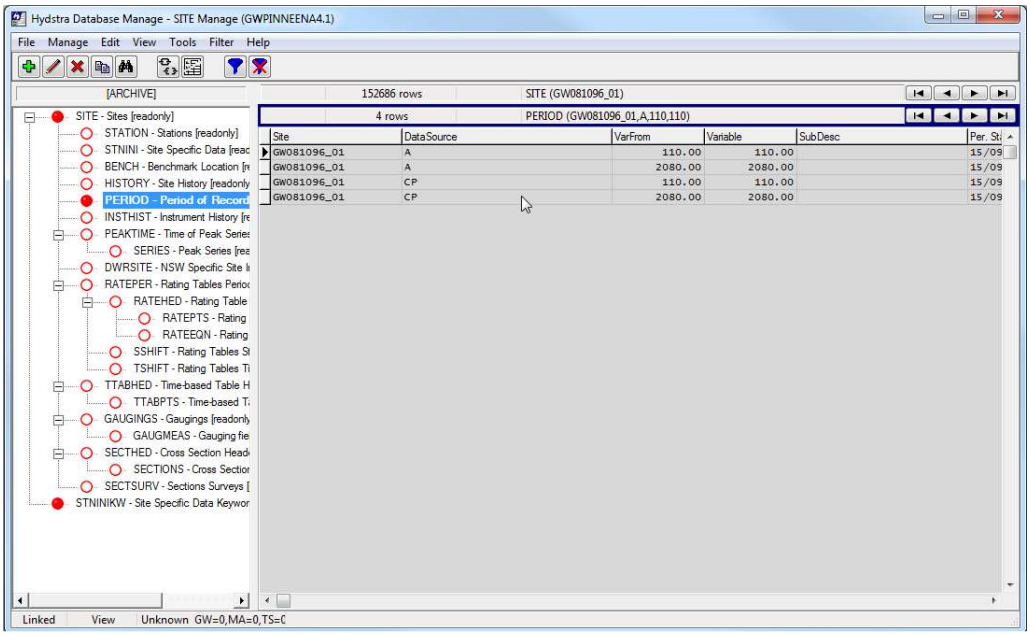


Browse View – view all fields for all tables

9.2 Linked Databases

All databases have a field or set of fields that uniquely identifies every record. Typically this is the eight character site number or site identifier. This is called the primary key of the table. Records are generally shown sorted by the primary key. The key is also used to define hierarchical relationships between tables. Many database programs will display a hierarchy of tables from a single screen. There will be the “parent” table, at the top of the hierarchy, with possibly several “child” and “grandchild” tables below.

What this means is that if you select site GW000010 in the SITE database above you will not only see the SITE record(s) for GW000010, you will also see the STATION record(s) for GW000010. Similarly PERIOD records etc.


Hydstra Database Manage - SITE Manage (GWPINNEENA4.1)
File Manage Edit View Tools Filter Help
[ARCHIVE]
152686 rows
SITE (GW081096_01)
4 rows
PERIOD (GW081096_01,A,110,110)
SITE - Sites [readonly]
STATION - Stations [readonly]
STNINI - Site Specific Data [reac
BENCH - Benchmark Location [r
HISTORY - Site History [readonly
PERIOD - Period of Record
INSTHIST - Instrument History [re
PEAKTIME - Time of Peak Series
SERIES - Peak Series [rea
DWRSITE - NSW Specific Site I
RATEPER - Rating Tables Perioc
RATEHED - Rating Table
RATEPTS - Rating
RATEEQN - Rating
SSHIFT - Rating Tables St
TSHIFT - Rating Tables Ti
TTABHED - Time-based Table H
TTABPTS - Time-based Ti
GAUGINGS - Gaugings [readonly
GAUGMEAS - Gauging fie
SECTHED - Cross Section Head
SECTIONS - Cross Sectior
SECTSURV - Sections Surveys [
STNINIKW - Site Specific Data Keywor
Site DataSource VarFrom Variable SubDesc Per. St
GW081096_01 A 110.00 110.00 15/09
GW081096_01 A 2080.00 2080.00 15/09
GW081096_01 CP 110.00 110.00 15/09
GW081096_01 CP 2080.00 2080.00 15/09
Linked View Unknown GW=0,MA=0,TS=0

To see the records for GW000020 we have to go back to the parent or top table (SITE) and select GW000020.

In the box at the left of the screen, all the tables in the system are displayed. You can choose the database you wish to be active by clicking on it. This will display the first entry for that site in the database you select.

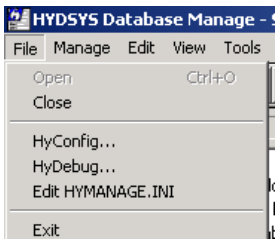
9.3 Menu Options

Access the full range of database menu options, can be gained by :

1. Moving the mouse across the menu item and selecting the desired option,
2. using the short cut keys (see above), or
3. clicking on one of the toolbar buttons.

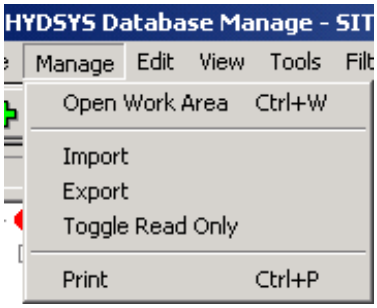
The database function keys only operate on the opened screen.

9.3.1 File



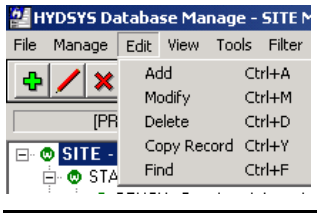
- Close – closes the currently open table
- HYCONFIG – allows you to make temporary changes to timeouts, paths etc. This will not usually need to be used.
- HYDEBUG – If you have problems running Pinneena, OFFICE or HYDSTRA may request you to run a program in debug mode. This will create huge files.
- Edit HYMANAGE.INI. - Not required.
- Exit – Exits the database system.

9.3.2 Manage



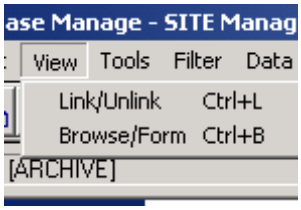
- Open work area – It is possible to export data from database tables to a work area, where they will be stored in the same format and structure as the archive tables. You may use Pinneena to make changes to the data in these work areas.
- Export – exports Pinneena data to a .CSV file or a work area.
- Import – may be used to import data from a .CSV file to a work area
- Toggle read only – toggles work areas between writeable and read-only. Writeable tables are shown with green dots next to them, read-only tables have red dots.
- Print – access to standard reports

9.3.3 Edit



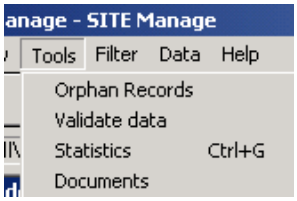
- Add, Modify, Delete and Copy Record – allow you to make changes to tables in work areas only
- Other Page - for multipage screens

9.3.4 View



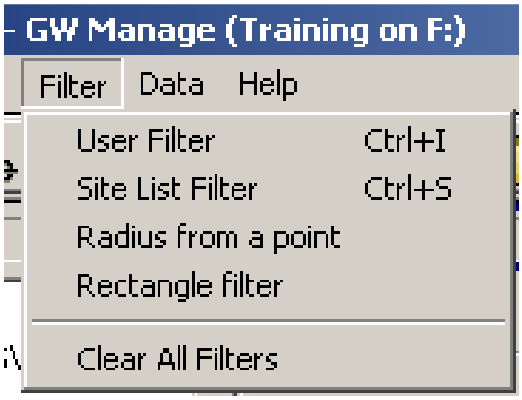
- Link / Unlink – links and unlinks parent and child tables.
- Browse/Form – toggles between table and form views.

9.3.5 Tools



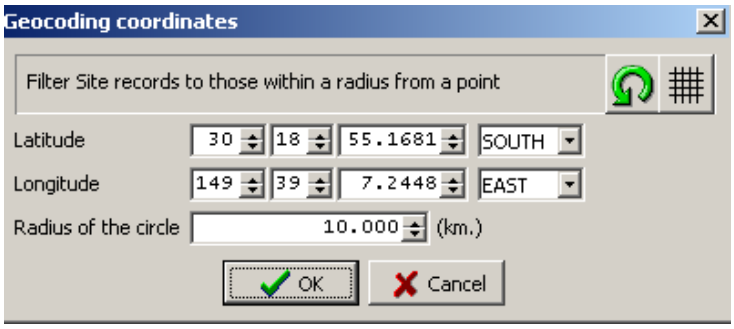
- Orphan Records & Validate Data – not available in Pinneena
- Statistics – calculates basic statistics on numerical data in the table
- Documents – shows documents and photographs related to the site

9.4 Filter



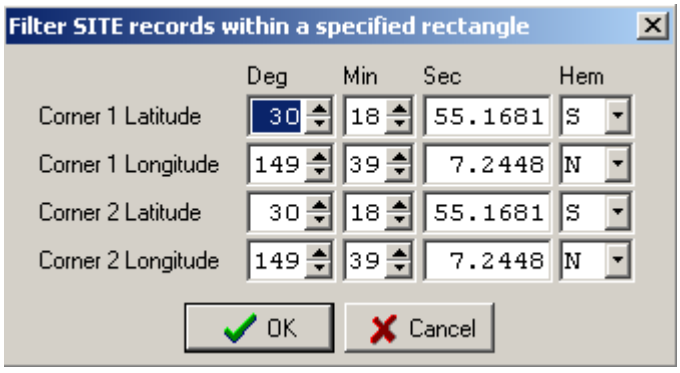
- User filter – allows you to set a filter as described above.
- HyStns Filter – allows you to filter on a list of sites created from the contents of a file or directory. For details, see the HYDSTRA documentation.

9.4.1 From a Point


Geocoding coordinates
Filter Site records to those within a radius from a point
Latitude 30 18 55.1681 SOUTH
Longitude 149 39 7.2448 EAST
Radius of the circle 10.000 (km.)
OK
Cancel

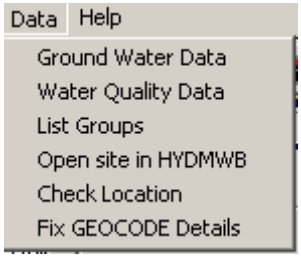
- Radius from a point – filters to all sites within a nominated radius from a point.

9.4.2 From a Rectangle


Filter SITE records within a specified rectangle
Deg Min Sec Hem
Corner 1 Latitude 30 18 55.1681 S
Corner 1 Longitude 149 39 7.2448 N
Corner 2 Latitude 30 18 55.1681 S
Corner 2 Longitude 149 39 7.2448 N
OK
Cancel

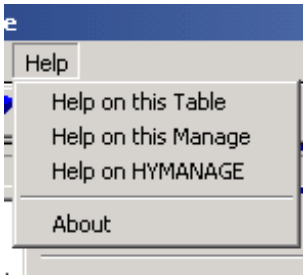
- Rectangle Filter
(give corner co ordinates)

9.5 Data



- Not applicable to Pinneena

9.6 Help



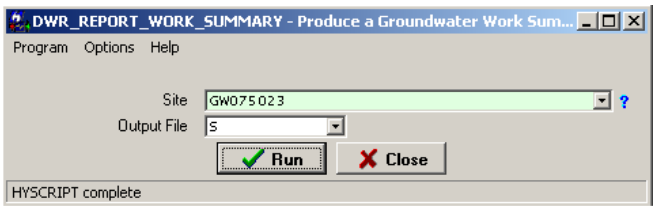
- Help on this table - provides information about the table in use, including its structure and the types of fields
- On this manage - displays system information
- Help on HYMANAGE – provides documentation and general information about using the databases
- About – displays version, release and storage usage information about HYMANAGE.

10.0 WORK SUMMARY SHEETS

Work Summary Sheets are created for all the bores by clicking as follows:

Note: There are bores that has nil information and will be resolved once when the data becomes available in HYDSTRA.

10.1 Input Screen



10.2 Outputs

NSW Office of Water
Work Summary

GW075023

Licence:		**Licence Status:**	
		Authorised Purpose(s):	
		Intended Purpose(s):	V1
Work Type:			
Work Status:			
Construct.Method:			
Owner Type:			
Commenced Date:		**Final Depth:**	18.50 m
Completion Date:	15/07/1998	**Drilled Depth:**	26.00 m
Contractor Name:			
Driller:	Dennis Michael Connell		
Assistant Driller:			
Property:		**Standing Water Level:**	
GWMA:		**Salinity:**	
GW Zone:		**Yield:**	

Site Details

Site Chosen By:

	County	**Parish**	**Cadastre**
Form A:	CUMBE	CUMBE.5	7068//1028505
Licensed:			

Region:	10 - Sydney South Coast	**CMA Map:**	9130-3S		
River Basin:	213 - SYDNEY COAST - GEORGES RIVER	**Grid Zone:**	?	**Scale:**	
Area/District:					
Elevation:	7.52 m (A.H.D.)	**Northing:**	6244016.0	**Latitude:**	33°55'52.2"S
Elevation Source:	Surveyed	**Easting:**	333638.0	**Longitude:**	151°12'00.3"E

Appendix A - Bore Numbering,

1.0 Manually Monitored Bores

1.1 Bore Numbers

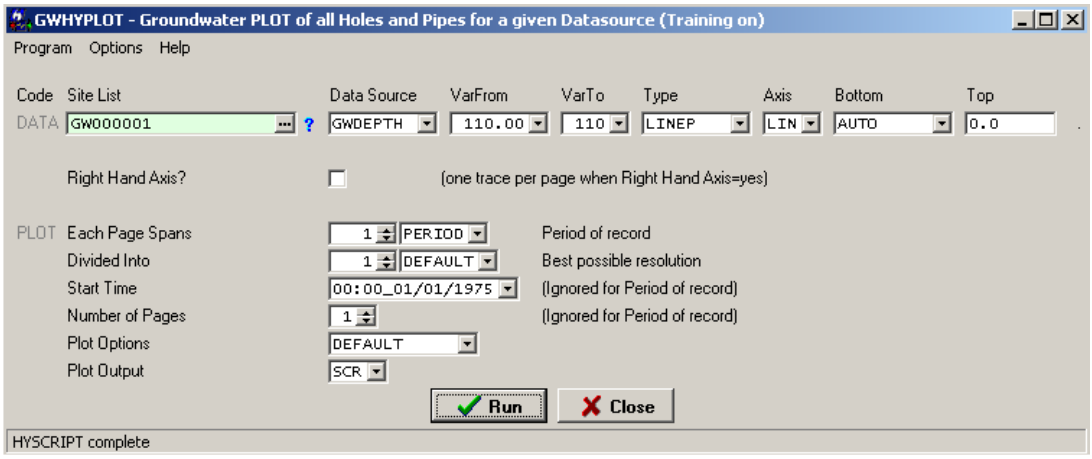
These bores retain their original bore numbers as per the Ground Water Database where the bore data is entered. The numbers ranges from GW000001 TO GW999999.

1.2 Data Source

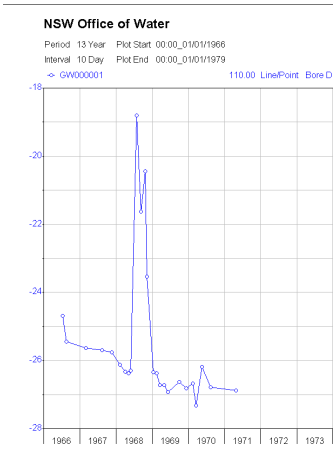
For these bores 'Data Source' to be used is GWDEPTH. An example for GW000001 (which is a manually monitored bore) is shown below.

1.3 Variable

Depth is indicated either as 110.00 or as 115.00 (in AHD).


GWHYPLOT - Groundwater PLOT of all Holes and Pipes for a given Datasource (Training on)
Program Options Help
Code Site List Data Source VarFrom VarTo Type Axis Bottom Top
DATA GW000001 GWDEPTH 110.00 110 LINEP LIN AUTO 0.0
Right Hand Axis?
(one trace per page when Right Hand Axis=yes)
PLOT Each Page Spans 1 PERIOD Period of record
Divided Into 1 DEFAULT Best possible resolution
Start Time 00:00_01/01/1975 (Ignored for Period of record)
Number of Pages 1 (Ignored for Period of record)
Plot Options DEFAULT
Plot Output SCR
Run
Close
HYSCRIPT complete

Outputs



2.0 Continuously Monitored (Logger) Bores

2.1 Bore Numbers Matching original numbers

2.1.1 Bores without multiple measuring Points

In the event there are no pipes or multiple measuring points, these bores retain their original bore numbers as per the Ground Water Database where the bore data is entered. The numbers ranges from GW000001 TO GW999999.

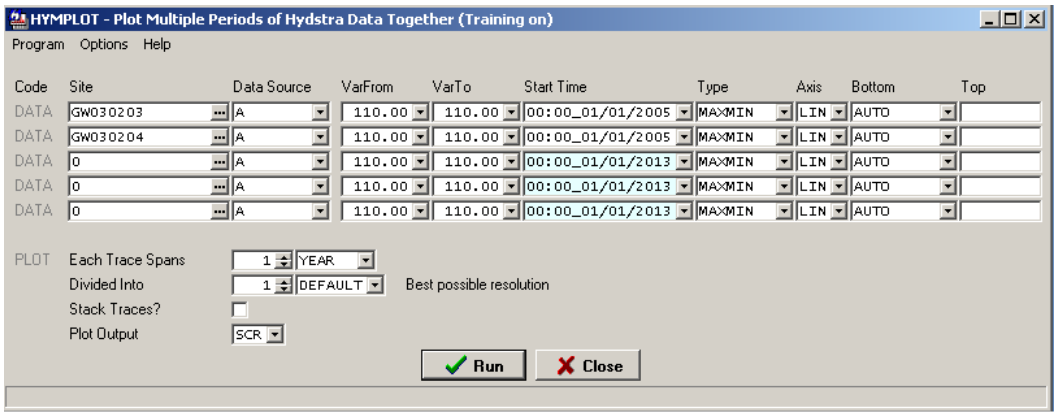
2.1.2 Data Source

For these bores 'Data Source' to be used is A. An example for GW030203, GW030204 (which is a continuously monitored bore) is shown below.

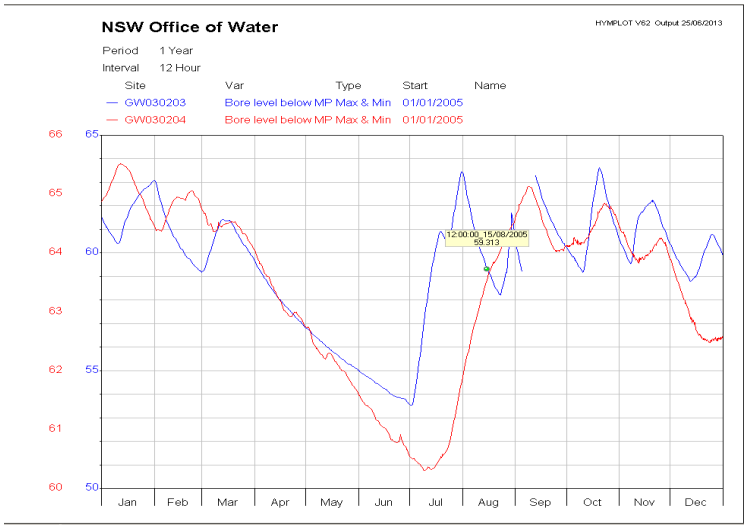
2.1.3 Variable

Depth is indicated either as 110.00 or as 115.00 (in AHD).

2.1.4 Input Screen


HYMPLOT - Plot Multiple Periods of Hydstra Data Together (Training on)
Program Options Help
Code Site Data Source VarFrom VarTo Start Time Type Axis Bottom Top
DATA GW030203 A 110.00 110.00 00:00_01/01/2005 MAXMIN LIN AUTO
DATA GW030204 A 110.00 110.00 00:00_01/01/2005 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
PLOT Each Trace Spans 1 YEAR
Divided Into 1 DEFAULT Best possible resolution
Stack Traces?
Plot Output SCR
Run
Close

2.1.5 Output


NSW Office of Water
HYMPLOT V62 Output 25/06/2013
Period 1 Year
Interval 12 Hour
Site Var Type Start Name
GW030203 Bore level below MP Max & Min 01/01/2005
GW030204 Bore level below MP Max & Min 01/01/2005
66 65 64 63 62 61 60
65 60 55 50
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

2.2 Bore Numbers ends with A,B,C

2.2.1 Bores with Multiple measuring Points

Using A, B, C for Pipes

Initially different measuring points were marked as A, B, C etc. for different Pipes.

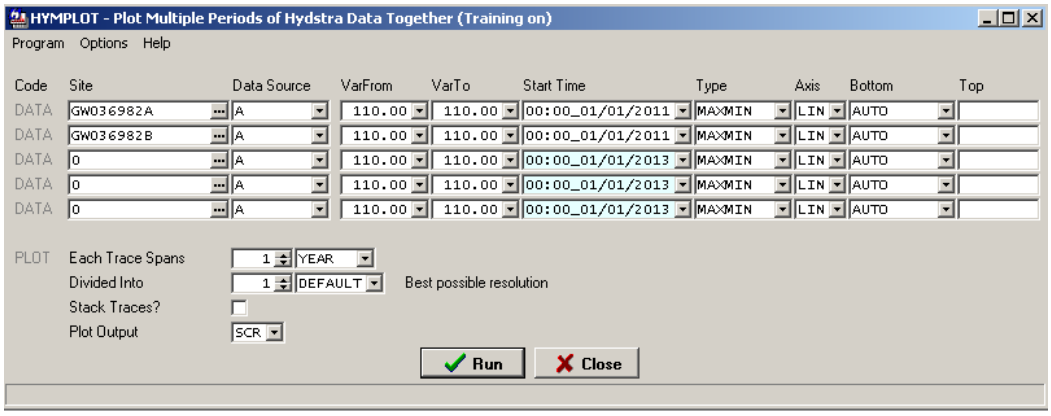
2.2.2 Data Source

For these bores 'Data Source' to be used is A. An example for GW036982A& GW036982B (which is a continuously monitored bore) is shown below.

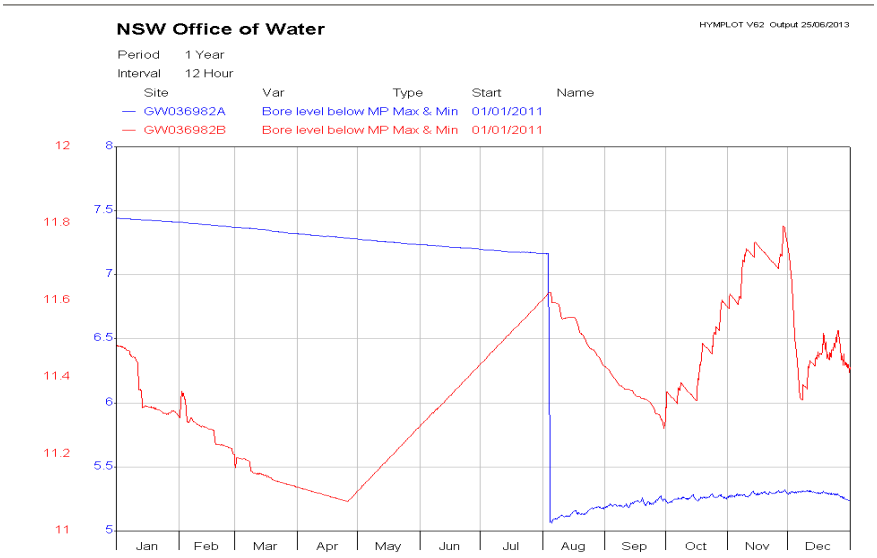
2.2.3 Variable

Depth is indicated either as 110.00 or as 115.00 (in AHD).

2.2.4 Input Screen


HYMPLOT - Plot Multiple Periods of Hydstra Data Together (Training on)
Program Options Help
Code Site Data Source VarFrom VarTo Start Time Type Axis Bottom Top
DATA GW036982A A 110.00 110.00 00:00_01/01/2011 MAXMIN LIN AUTO
DATA GW036982B A 110.00 110.00 00:00_01/01/2011 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
PLOT Each Trace Spans 1 YEAR
Divided Into 1 DEFAULT Best possible resolution
Stack Traces?
Plot Output SCR
Run
Close

Output



2.3 Bore Numbers ends with _1,_2,_3

2.3.1 Bores with Multiple measuring Points

Using _1,_2,_3 for Pipes

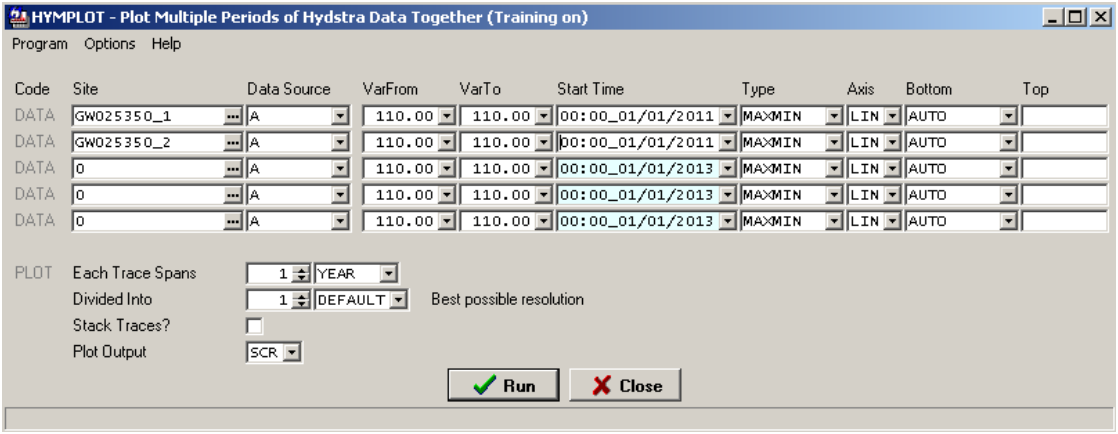
After A, B, C different measuring points were marked as _1,_2,_3 etc. for different Pipes.

2.3.3 Data Source

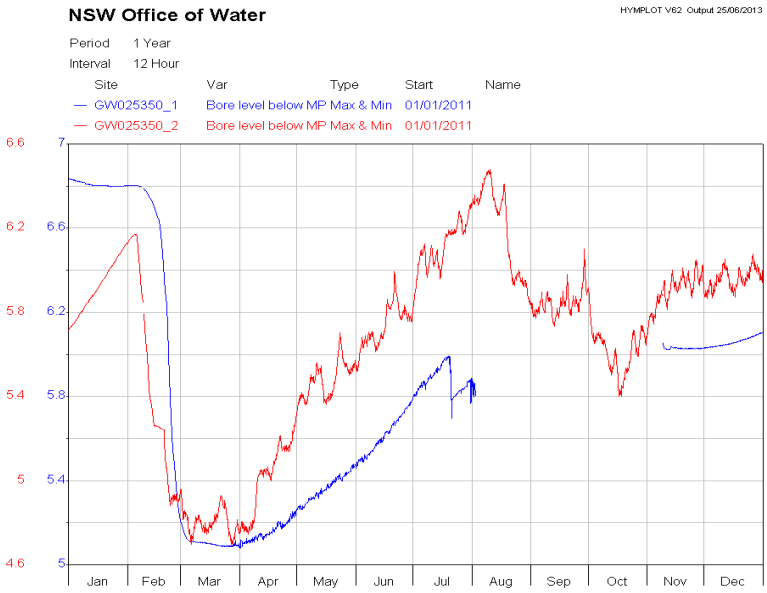
For these bores 'Data Source' to be used is A. An example for GW036982A,B (which is a continuously monitored bore) is shown below.

2.3.4 Variable

Depth is indicated either as 110.00 or as 115.00 (in AHD).


HYMPLOT - Plot Multiple Periods of Hydstra Data Together (Training on)
Program Options Help
Code Site Data Source VarFrom VarTo Start Time Type Axis Bottom Top
DATA GW025350_1 A 110.00 110.00 00:00_01/01/2011 MAXMIN LIN AUTO
DATA GW025350_2 A 110.00 110.00 00:00_01/01/2011 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 A 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
PLOT Each Trace Spans 1 YEAR
Divided Into 1 DEFAULT Best possible resolution
Stack Traces?
Plot Output SCR
Run
Close

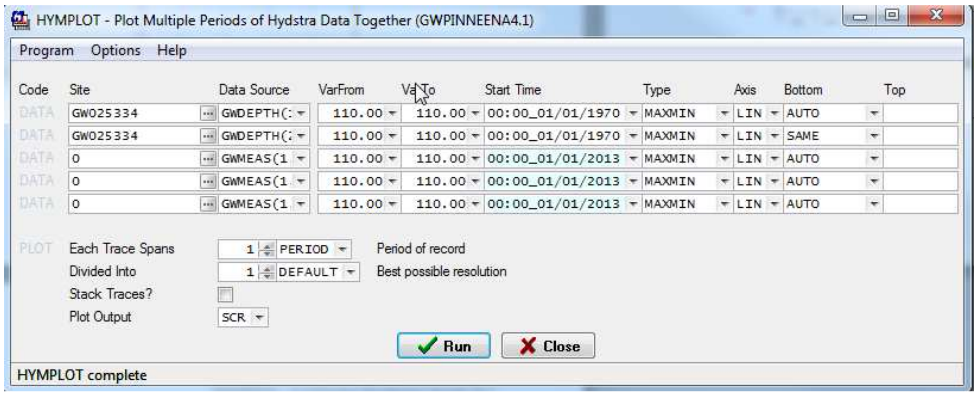
2.3.5 Output

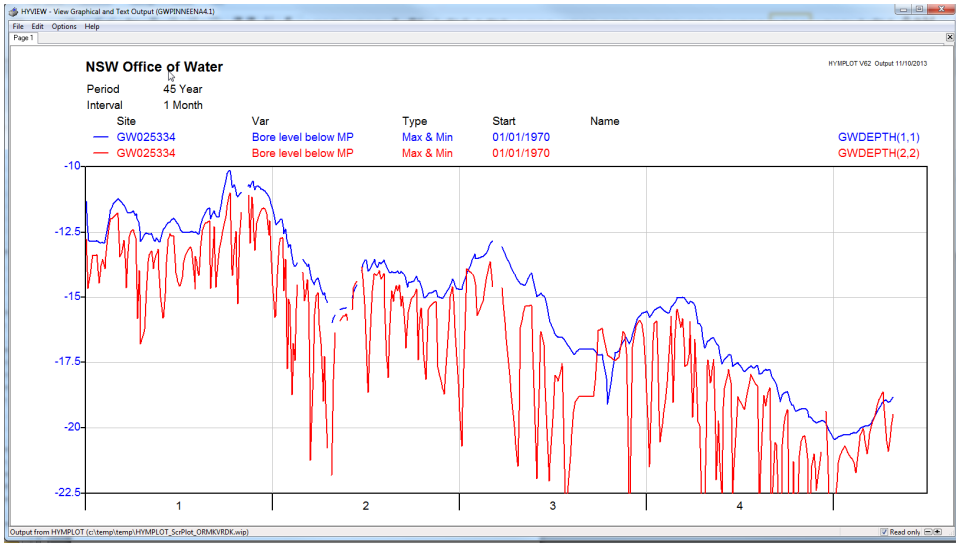

NSW Office of Water
HYMPLOT V62 Output 25/06/2013
Period 1 Year
Interval 12 Hour
Site Var Type Start Name
GW025350_1 Bore level below MP Max & Min 01/01/2011
GW025350_2 Bore level below MP Max & Min 01/01/2011
6.6 6.2 5.8 5.4 5 4.6
7 6.6 6.2 5.8 5.4 5
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Then finally (currently) pipes were marked as _01,_02 & _03.

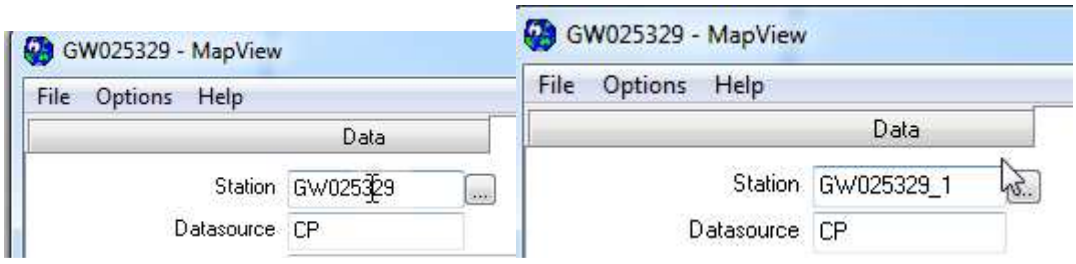
2.3.6 Output with GWDEPTH Datasource

Default Datasource for 'Mannually Monitored' descrete bores is GW(1,1), GW(2,2) etc. This plots consideres depth as positive eventhough it is measured from groundlevel downwards. In this version we have to mannually change the 'Datasource' to GWDEPTH(1,1), GW(2,2) etc to get the actual plots.


HYMPLOT - Plot Multiple Periods of Hydstra Data Together (GWPINNEENA4.1)
Program Options Help
Code Site Data Source VarFrom VarTo Start Time Type Axis Bottom Top
DATA GW025334 GWDEPTH(: 110.00 110.00 00:00_01/01/1970 MAXMIN LIN AUTO
DATA GW025334 GWDEPTH(: 110.00 110.00 00:00_01/01/1970 MAXMIN LIN SAME
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
DATA 0 GWMEAS(1 110.00 110.00 00:00_01/01/2013 MAXMIN LIN AUTO
PLOT Each Trace Spans 1 PERIOD Period of record
Divided Into 1 DEFAULT Best possible resolution
Stack Traces?
Plot Output SCR
Run
Close
HYMPLOT complete



2.3.7 Hydrographs Plot in MAPS – Applicable to Continuous Depth Plots only



There may be a an Archive data for GW025329 as they are represented as gw025329_1 . Hence the station need to be changed as GW025329_1. This is done by selecting from dropdown menu available for stations.

Appendix B - PINNEENA 10.1 Short Cut Keys

From the Menu screens

<**F1**>	Help - allows you to browse the documentation for the program highlighted
<**F8**>	Rerun - will restore the last parameter screen for the program highlighted
<**F9**>	DOS - will shell you to DOS
<**Esc**>	Abort - will exit from the current menu screen

From the Parameter screens

<**F1**>	Help - will give information about the field if available
<**F2**>	Lookup - will allow you to select from a lookup table
<**Enter**>	Execute the program (Standard Windows definition)
<↑>	Up Arrow - will move the cursor to the next line up,
<↓>	Down Arrow - will move the cursor to the next line down,
<← →>	Across Arrows - will move the cursor sideways in a field
	Across Arrows - at either end of the field will move cursor to the next field
<**Esc**>	Abort - will exit from the parameter screen, and
<TAB>	Move you forward through the data
<SHIFT><TAB>	The Shift -Tab combinations move the cursor back through the data

From Database screens

<**Ctrl-P**>	Print - allows you to print the screen or the database
< **Ctrl-B**>	Browse – toggles between table and form views
< **Ctrl-F**>	Find - allows for searches on the gauging site number only
<**Tab**>	Move - moves the cursor between database windows (where applicable)
<**Home**>	Top - moves to the first record
<**End**>	Bottom - moves to the last record
<**PgUp**>	When in table view, moves up 20 records
<**PgDn**>	When in table view, moves down 20 records
<↓>	Next - moves to the next record
<↑>	Previous - moves to the previous record

Appendix C - Product Evaluation

To enable us to keep you up to date with product enhancements, we ask that you take the time to fill in both pages of this evaluation report. The first page requires details of your hardware and applications. This information, together with your address , will enable us to keep you informed about product development as well as being a handy reference for our help desk.

The second page is a product evaluation. We would appreciate your comments on the programs and documentation, once you have explored **PINNEENA GW 10.1** and have some experience with its use.

PINNEENA EVALUATION		
Organization	**Address**	
…… …… …… ……	…… …… …… ……..	
Contact Person	**Phone**	**Fax**
…… …… ……	(.....).....	(.....).....
E-Mail		
Computer System (tick first line)		
OS: 2000..… XP……VISTA..... Win 7..... Win 8/8.1..... CPU Type: Pentium III/IV…..DUAL Core…..Quad Core…… 64 BIT……. 32 BIT…….. AMD32…….. AMD64…… CPU Speed:……..MHz RAM:……Mb Hard Disk Size……..Mb		
Program Use (e.g. research, consulting, etc.)		
……... ……		

Experience	**Yes/No**	**Number of Years?**	**Comment**
Are you experienced with HYDSTRA software?			
Are you familiar with PCs and the Windows OS?			
Are you experienced in Hydrogeology?			
Are you experienced with Mapping programs?			

System Use	**Yes/No**	**Comment**
Do you use other Hydrological or Statistical Packages ? If so what package?		…… …… ……..
Is it easy to transfer data to this package?		…….. ……

PINNEENA EVALUATION					
Do you use the HYDDE or HYDLL programmatic access to data?			…… ……		
How do you access the data? Please tick main access	**MapHYD**		**HYDSTRA Plot Programs**		
	Precomputed Reports		**HYDSTRA Report Programs**		

HYDSTRA Use	**Yes/No**	**Comment**
Do you use the Pre-computed Reports in MapHYD ?		…… …… ……
Would you like to see other reports in this section ?		…… …… ……
Did you find the general HYDSTRA programs easy to use ?		…… …… ……
Is there enough help to enable you to use the programs ?		…… …… ……
Have you had any problems running particular programs ?		…… …… ……
Have you any other suggestions or comments ?		…… …… …… …… …… ……

Documentation Evaluation	**Comment**
What was your initial impressions of the documentation and product?	…… …… ……
How often (and why) do you need to refer to the documentation?	…… …… …… ……
Any other comments or suggestions regarding documentation?	…… …… ……

Please return this evaluation to:

Water Information Systems Manager

NSW Office of Water
PO Box 3720
Parramatta NSW 2124

Or email a copy to: waterinfo@water.nsw.gov.au